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# THE IRON AGE

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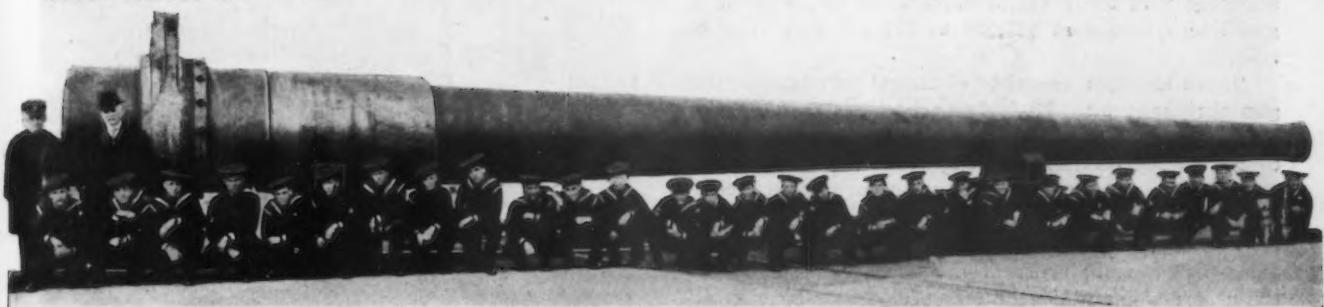
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# THE IRON AGE

New York, March 31, 1927

ESTABLISHED 1855

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## Fashioning Steel into Naval Guns

United States Navy Operates America's Greatest  
Ordnance Supply Source Close to National  
Capitol—Massive Machinery Employed

BY GEORGE H. DACY\*

LOCATED a short distance from the United States Capitol in Washington, a city far separated from ordinary industrial plants, is one of the finest gun factories in the world. This establishment converts ordnance steel into naval armament ranging from one-pounders up to the gigantic 16-in. 50-caliber pieces. It not only manufactures, but also keeps in perfect repair, all the guns now used by the United States Navy.

Whenever big or little guns require re-rifling or repair, the vessel visits some stipulated drydock or navy yard. The guns are lifted from their steel-shod mounts and are freighted to the Washington Navy Yard, on the Potomac, either by water or by rail. This mammoth plant, housed in a massive building of concrete and steel, 572 ft. long, 243 ft. wide and 135 ft. high, is equipped with the finest of gun-making tools. The peace-time complement of about 2500 men is increased to as many as 10,000 employees during a war emergency.

Among the outstanding equipment are 19 lathes which range from 120 to 204 ft. in length and in swing from 102 to 120 in. These lathes are driven by electric motors, some reaching 100 hp. One of them has an extraordinary feed screw which is 5 in. in diameter and 202 ft. long. Two huge rifling machines are adapted for handling the heaviest rifles ever manufactured. Other and smaller equipment is designed for making secondary-battery guns.

Seven electric cranes include a trio of which the maximum burden reaches 380 tons. The largest guns which are handled (16-inch) weigh 286,135 lb. each.

Five of the 14-In. Naval Guns, One of Which Appears at Top of Page, Mounted on Railroad Trucks, Were in Action Against the Germans Before the Armistice. They were the most powerful weapons used on land by any of the combatants.

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Most of the gun repairs at present consist of re-rifling jobs or of fitting the weapons with new liners. A remarkable shrinkage pit is used for this work. This huge concrete chamber was built in exactly "reverse English" style to the methods of construction commonly followed. Unstable soil conditions demanded that the pit be built from the top downward, instead of in orthodox fashion, from the bottom upward.

Instead of excavating the 100-ft. pit, walling it up with supporting timbers and then laying the concrete walls, sections were cast at the surface in units 6 ft. thick and 6 ft. high. The first section was placed directly below the surface. After the concrete had hardened, this unit of wall was undermined and lowered and another similar section was placed above it. This process was continued until finally monolithic walls 100 ft. high and 6 ft. thick had been sunk into place as the borders of the shrinkage pit. The bottom, also of cast concrete, was made 10 ft. thick.

The shrinkage pit is divided into ten compartments, each 12 ft. square and 90 ft. deep. There is an electrically operated elevating table in each gun pit, which can be regulated to accommodate armament of all sizes from 3-in. to the heavy 16-in. guns. One of the most powerful cranes in the factory is employed to lift and raise the heaviest guns in and out of this pit. This crane, which has a clear lift of 97 ft. above the gun shop floor, responds to delicate control.

### Method of Relining Heavy Guns

GUNS to be relined are heated by electricity for a period of 20 hr. at a temperature of from 500 to 800 deg. This heat exposure produces maximum expansion of the fine quality ordnance steel. The rifled liner is then swung into position over the gun pit by crane power and at exactly the right time is lowered into the hot steel jacket of the gun. A large hydraulic jack is then locked into place over the mouth of the

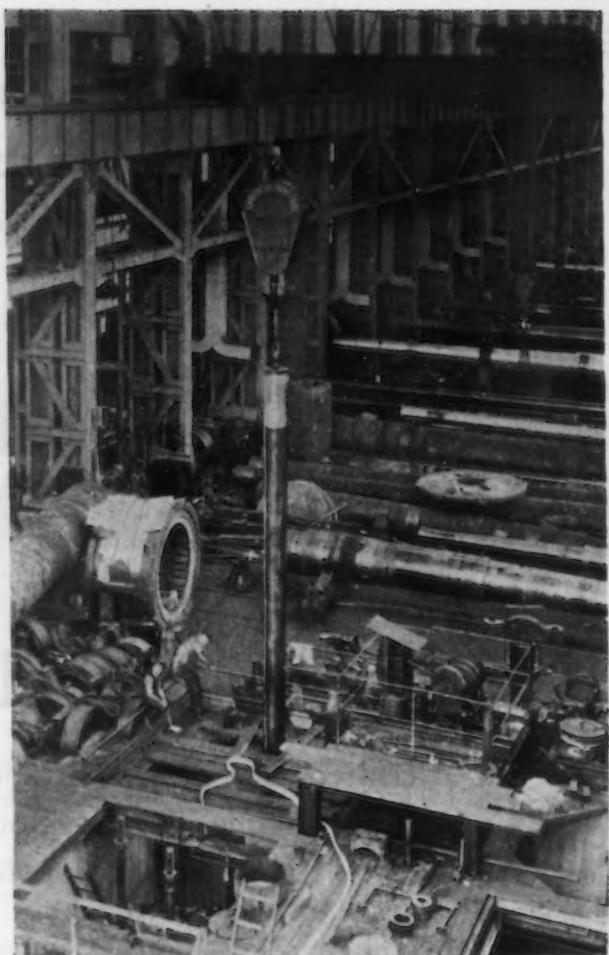
gun to hold the liner in position during the shrinkage process. As the steel jacket cools, it grips the liner with great tenacity.

This business of re-lining these naval guns—great and small—is truly marvelous in the mathematical accuracy which obtains. The fit is usually so snug that minute fractions of measurement, as small as one or two thousandths of an inch, are dealt with. The tolerance errors are so small that they seem entirely insignificant to the layman. To the gun-makers, reliable accuracy is of the greatest importance for, without it, gun liners valued at \$15,000 to \$25,000 each may be ruined.

There are four complete electrical furnaces in this gun shrinkage pit. Each furnace consists of circular sections from 34 to 66 in. high, which are quite similar to the forms used in building a concrete silo. This arrangement facilitates building the furnace to accommodate any size or style of gun. The furnace—a monster cylinder of steel—insulates and incases the gun which is to be re-lined. Electrical coils distribute the heat and maintain the temperature uniform in all parts of the furnace during the gun-expanding period.

Observers keep tab on the furnace temperatures, during the operations, by means of special heat registering gages. Never before in engineering history has such a large electrical furnace been used. If the four furnaces at the Washington Navy Yard were operated at full capacity at the same time, sufficient power to light a city of 100,000 people would be required.

Firing tests of these naval guns are conducted alongside the Potomac River at the Dahlgren proving ground, after the essential ordnance repairs have been



*Inserting a Completed Liner in a Big Gun in the Shrinking Pit. This view shows clearly the massive character of building required to carry 380-ton cranes*



*Aluminum-Bronze Ingot Weighing 15,000 Lb. This is said to have been the largest of its kind ever cast in the United States. It was used in ordnance manufacturing in the Washington Navy Yard*

made. The guns are transported by barge to Dahlgren, where they are mounted and tested for range and firing accuracy under a wide variety of conditions. If the firing tests are satisfactory, the guns eventually are returned to their respective ships and mounted for sea service. Guns which do not come up to specifications on the range are returned to the ordnance factory for additional work.

#### Recovering Much By-Product Metal

PROCESSES involved in manufacturing new guns are both interesting and intricate. The Washington Navy Yard operates a steel and brass foundry where rough forgings used in armament production are made from by-product materials, machine shop trimmings, cartridge cases and obsolete gun mounts, which are classified as scrap. Instead of selling these waste materials to the junkman, they are made over into ordnance steel or non-ferrous metals, as the case may be. During the last fiscal year, 3,952,722 lb. of forgings for naval ordnance were made at this plant.

Both carbon steel and the various alloy steels such as nickel steel, chrome nickel and chrome-vanadium are produced. The steel and iron forgings which are made range in weight from one ounce to 45 tons, while bronze castings as heavy as 20 tons are produced. One million pounds of ordnance steel, 700,000 lb. of cast iron and 733,186 lb. of brass castings were made in the Government mills last year.

Large steam-hydraulic presses are features of the Navy Yard forge shop. One is a 2000-ton forging press which weighs 1,000,000 lb. It required 30 freight cars to deliver this machine when it was purchased. The press and its foundation were installed at a total cost of \$200,000. When in active service, shaping and molding hot metal, this press is under as efficient con-

*Preparing to Bore a 14-In. Naval Gun, Preliminary to Relining it. The boring tool appears at right. The sturdy design of the steady rests for the gun is shown by comparison with the man*



tral as a telegrapher's key. The descending die delivers a blow of 4,000,000 lb.

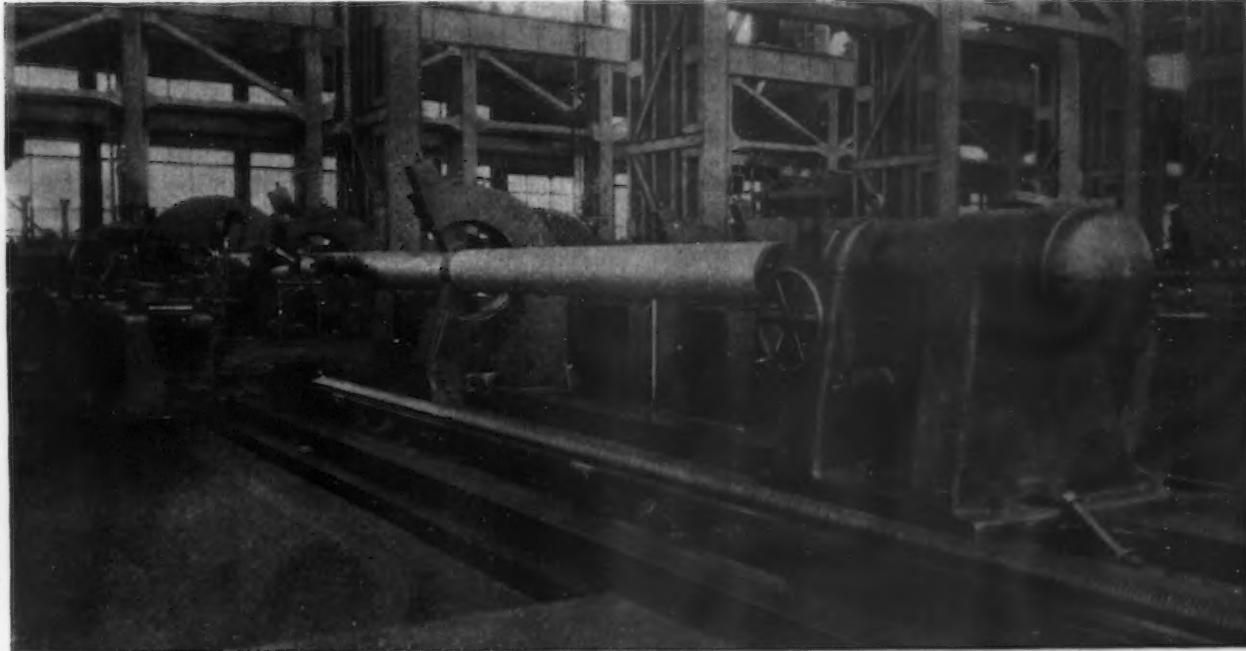
A recent achievement in this forge shop was the production of 15,000-lb. bronze-aluminum alloy forgings as coverings for submarine guns. They protect the ordnance against salt water corrosion and are said to be the largest forgings ever made of such an alloy material. Three catapults or airplane launching devices weighing 20,000 lb. each were completed lately, in the form of rough forgings.

Large ordnance rings, some of which are 22 ft. in diameter and weigh 25 tons or more, are manufactured by an inexpensive and efficient system of forging originated and perfected by the United States Navy. These rings are not welded nor fused together by acetylene or electrical processes. They are made from solid cast steel, which is shaped, slotted, curved, cut and molded to form the completed rings by a clever and unique system.

#### *Building New Guns*

ROUGH gun forgings, when delivered to the gun factory, are turned and bored to finished dimensions and then are heated in the shrinkage pits. The big and little guns are made by a simple building-up process. A large heated forging of cylindrical shape is lowered over a smaller (cold) one and then is shrunk into permanent place. Then another, yet larger, cylinder of steel encircles the others and, when the hot metal cools to ordinary temperatures, it contracts and grips, under enormous pressure, the forging upon which it is shrunk. A modern naval gun consists of ten or twelve forgings assembled in this way.

One of these 8-in. guns weighs 19 tons when completed and fires a 260-lb. projectile. A 12-in. gun is a 56-ton masterpiece of steel and workmanship and throws a shell weighing 870 lb. The gigantic 16-in. gun belches forth a steel projectile weighing 2100 lb.



*One of the Massive Gun Lathes Turning a Heavy Gun Liner. The man at central tool fixture shows its size. The lead screw in foreground is supported by an ingenious fixture which permits the tools to pass*

The 14-in. naval guns made in Washington and used in France during the World War were the most powerful armament in either the allied or the Teuton armies. The maximum range of these guns was 52,000 yards (not quite 30 miles). A monumental transportation problem, however, was associated with moving them over the foreign railroads.

French engineers at first refused to transport America's "big Berthas," and it was not until the German long-range guns threatened Paris that this mighty armament was loaded aboard special railroad mounts. Bridges shook and shivered until the heavy trainload had passed and curves, not built to handle such material, were negotiated. The foreign locomotives snorted and puffed in climbing the grades. Each of these American guns weighed 96 tons and its shell had a muzzle velocity of 2800 ft. per sec.

Ten years before the Civil War, the Washington Navy Yard was responsible for the conversion of smooth-bore guns into rifled armament, while it also

engineered the substitution of cylindrical and pointed projectiles for the historic round shot which previously had been used. From then to now, this gun factory has been writing ordnance history. Many efficient reforms in design have been achieved here.

#### Peaceful Work, Also

During peace-time, the outstanding manufacturing facilities of the Washington Navy Yard are harnessed to assist the other Government departments by supplying such materials as mail boxes for the Post Office Department [See *THE IRON AGE* of Nov. 11, 1923, page 1369], money plates for the United States Treasury, repairs for airplanes and similar accessories. All this work is done under competitive contracts. The Navy Yard bids for the jobs in the same way as commercial concerns. The Government policy is to award contracts to the lowest reliable and responsible bidders. The national ordnance factory, hence, wins much spare-time work wholly on merit.

## Electricity in Industrial Heating

### Heat-Treating Departments Need Improving—Forging Furnaces Have Faults—Advantages in Melting Gray Iron and Brass Electrically

**I**N the course of a comparatively few years, the industrial electric heating load in the United States has grown from almost a negligible figure until at present it is in excess of 3,000,000,000 kwhr. annually. This number of kilowatt hours may be visualized more readily if it is considered that, to give this service, there would be required a power plant capable of carrying a load of 375,000 kw. continuously for 24 hr. per day and for 365 days. In an effort to provide plant executives with information on the latest developments in the application of electric heat to manufacturing processes, a conference on that subject was held at Purdue University, Lafayette, Ind., March 23, 24 and 25.

In addressing the conference, J. E. Nelson, power engineer Indianapolis Power & Light Co., Indianapolis, Ind., pointed out that the rapid growth of the heating load could be taken as a true indication that electric heat is producing economical results for industry. In reference to the advantages of electric heat he said that "computations made to determine the heating capacity and consequent cost are based on the kilowatt hour, which incidentally is the unit of service paid for. A kilowatt hour produces a definite amount of heat—3412 B.t.u.—when consumed and expended in the form of heat. Neither the company that produces and sells electric energy, nor the consumer, can vary the heat content of the kilowatt hour. The heat produced per electric unit is independent of atmospheric conditions and since that heat is not the result of combustion, the atmospheric conditions in the furnace are neutral. To these advantages must be added the ability to apply electric heat capacity at the desired point, and also the ease with which temperature can be controlled."

Tests indicate that japanning and drying ovens may be operated satisfactorily by changing the air 12 times per hour, but as explained by L. Jordan, superintendent pyrometer department Studebaker Corporation, South Bend, Ind., it is better to provide 18 to 30 changes per hour and assure safe and satisfactory working conditions.

"The necessity for improved heat-treating methods is the result of a demand for lighter sections and correspondingly lower factors of safety," said E. F. Davis, metallurgist Warner Gear Co., Muncie, Ind., in a paper, the title of which was "Heat-Treating Furnaces and Methods." "Today many heat-treating departments in otherwise modernly equipped organizations," he said,

"are shamefully neglected units. Go into many plants and, after admiring various phases of fabricating efficiency, visit the heat-treating department. A place of smoke and grime, dirt floors, men operating inefficiently and laboriously, badly constructed furnaces, fuel wastage and poor pyrometric equipment. Why does such a condition exist? Why will a management balk at paying \$5,000 for a modern furnace but will spend it readily for a machine which will increase its production 20 per cent on one part. Is not a dollar saved in the heat-treating department as good as a dollar saved in the machining lines? Sometimes I believe it is because the heat-treating department lacks champions. Many factory executives have risen to responsibility from the shop, and with their thought and energy always concentrated upon the mechanical problems of production, they have failed to fully realize the possibilities which lie dormant in improving heat-treating operations. Why does it cost 9c. to 12c. per lb. to carburize? It can be done for 6c. per lb. The installation of a modern annealing furnace in one plant eliminated the labor of nine men, saved \$500 per month on the gas consumption and reduced furnace repairs \$2,400 per year.

#### Under-Fired and Over-Fired Furnaces

"Under-fired furnaces should always be used for annealing alloy and high-carbon steels. Over-fired furnaces will not produce uniform temperatures in the furnace by the very principle of over-firing. I realize, in making this statement, that many over-fired furnace installations may be found in different plants, but those I have investigated all have the same common defects—cold floors, flame impinging on the work, hot and cold areas and a general lack of uniformity. Under-fired furnaces provide a hot hearth, hot side walls and hot arch and uniform heat radiance. Most annealing furnaces are gas or oil-fired, but many of the newer installations are using electric elements. Electric heat is ideal for nearly all annealing operations. The chief objection is the high initial cost.

"In heating steel for hardening or tempering, four methods are in common practice: Heating by immersion in some liquid or molten medium; by direct radiation of the heat to the work; by conveying the heat directly to the work by flame or combustion blast; and by transferring the heat by an air blast previously heated.

"Immersion heat-treating can be used for all ranges

of temperatures from 250 deg. Fahr. The temperatures from 250 deg. Fahr. to 1250 deg. Fahr. may be regarded as the annealing or drawing ranges; oil or nitrites are suitable up to 600 deg. Fahr.; saltpeter from 600 to 1000 deg. Fahr.; and lead above 1000 deg. Fahr. For drawing the temper, oil or nitrites are the best mediums and should be employed in preference to air-drawing furnaces.

"A good drawing oil can be purchased for around 30c. per gallon. A price of 12c. to 14c. for drawing salts does not seem to be excessive until one considers that the salt is used molten and a gallon of molten nitrite salt costs from \$1.50 to \$2.50. Electric heating of oil-drawing furnaces are preferable to gas or oil for they reduce the fire hazard and practically eliminate it, if the electric units are sheathed and the units are not exposed to oil vapors. With additional electrical control, temperatures can be held within a limit of 10 deg. and such furnaces can be placed in progressive production lines.

"For hardening by immersion, lead and cyanide mixtures are the most common mediums in use. Lead is not suitable for temperatures above 1600 deg. Fahr., due to rapid oxidation of the lead. For temperatures between 1600 deg. Fahr. and 1800 deg. Fahr., barium chloride, which melts at about 1500 deg. Fahr., should be used if slight decarburization of the surface is not detrimental. Immersion methods above 1800 deg. Fahr. so far have not met with a great degree of success, due to the inability to produce pots which will give satisfactory life, and the difficulty of designing furnaces with ample heat capacity. Cyanides produce the cleanest work of any of the molten mediums. Cyanides are solvents for oxides and, except for a gray cyanide stain, the work comes out of cyanide as clean as it enters.

"I do not recommend electric heating for cyanide immersion hardening, for several reasons. First, the operating costs are excessive; second, the installation costs are too high compared with gas and oil furnaces; and last, danger always exists of burning out the unit by accidental spillage of cyanide, for molten salts are conductors and will produce a short in the elements.

#### Electric Heat for High Temperatures

"For heat-treating operations between 1400 deg. Fahr. to 1600 deg. Fahr. the electric furnace comes within its widest field of usefulness, for the radiation principle of heat transfer is most effective within these ranges. With electric elements for heating and electrical control, any desired temperatures can be regulated with fine exactitude. Electric control may be regarded as the micrometer of heat-treating and is absolutely necessary for uniform hardening.

"Since electrical heat shows economy only where it is not wasted, but held within the furnace by insulating mediums, it is very doubtful that electrically fired carburizing furnaces of present design will show any economy if the fuel alone is considered. But for exact temperatures, a vital thing in carburizing, the electric fuel is superior. Furthermore, the fuel represents only about 4 per cent of the process cost. Pots and lids make up 15 per cent of the cost, carburizer 30 per cent, furnace depreciation 4 per cent, and labor 45 per cent."

#### Forge Furnaces Need Improvements

Mr. Davis was emphatic in his statements regarding the improvements that are needed in the design and operation of forge furnaces. "Raising the steel to a very high temperature," he said, "decarburizes it, increases the grain size, and weakens the inter-crystalline cement. Forging decreases the grain size again and mitigates a portion of the evil. If much work is done in forging, the trouble is minimized; if little work, the grain size remains large. If a billet is heated to 2100 deg. Fahr., and finished at 1600 deg. Fahr., a good forging can be expected. If a billet is heated to 2350 deg. Fahr. and finished at 2000 deg. Fahr., a poor forging will result. The effect of high forging temperatures is ruinous to steel quality. Over-heated forgings are sluggish to thermal changes. They do not anneal readily, do not harden satisfactorily, are weak to impact, and show a dry, coarse fracture. I have seen bars

pulled from forge furnaces for upsetting which actually fell apart from their own weight.

#### Gray Iron Melted Electrically

That manufacturers of electric furnaces are turning their attention to the production of gray iron castings was indicated in a paper entitled, "Melting Gray Iron in the Electric Furnace." This paper was read by H. E. Bromer for W. B. Wallis, president Pittsburgh Electric Furnace Corporation, Pittsburgh. After reviewing briefly the development of electric melting furnaces, the author presented the following comparative cost figures:

Electric furnace:	
800 lb. foundry returns at \$22.95 per gross ton	
400 lb. heavy cast scrap at \$22.95 per gross ton	
800 lb. cast iron borings at \$17.07 per gross ton	
Melt loss .....	4 per cent
Total .....	\$19.13 per net ton
Electrode and refractory cost .....	\$1.28
Labor .....	0.85
450 kwhr. at 1.20c. .....	5.40
Ferroalloys and coke added .....	1.50
Total cost .....	\$28.16 per net ton
Cupola practice:	
1000 lb. pig iron at \$28.68 per gross ton	
1000 lb. heavy cast scrap at \$22.95 per gross ton	
Melt loss .....	8 per cent
Total .....	\$24.89 per net ton
Labor .....	\$1.23
335 lb. coke at \$10 per net ton .....	1.68
Power .....	0.60
Total .....	\$28.80 per net ton

Attention was called in this paper to the fact that comparative costs were usually unfavorable to the electric furnace because its product has been placed on a quality basis. It was contended that the electric furnace can make high-grade castings from an all-scrap charge. Further advantages of the electric furnace are: Control of product during the melt, close temperature regulation, finely divided carbon content in the product, and the absence of sulphur pick-up.

The author pointed to several installations where a single electric furnace is run alternately on gray iron and steel. One precaution is necessary, however, in changing from iron to steel. Mill scale or ore should be used to prepare the bottom in order to avoid an excess of carbon in the first charge of steel.

#### Melting Brass in Electric Furnaces

That the saving of metallic losses alone will usually justify the installation of electric furnaces in brass foundries was pointed out in a paper on "Melting of Brass in the Electric Furnace," by E. L. Crosby, president Detroit Electric Furnace Co., Detroit. The metallic loss in fuel-fired furnaces often runs as high as 3 to 6 per cent, whereas in the electric furnace the loss need not exceed 1/4 of 1 per cent over extended periods, said the author. Improved quality of product is a further advantage of the electric furnace, this being shown not alone at the first inspection in the foundry, but in rejections resulting from defects disclosed after much machine work has been performed on various parts.

"The rapid melting of brass," said Mr. Crosby, "cuts down the absorption of deleterious materials. In 1918, a 2000-lb. furnace was rated at 300 kw. and six or seven heats were poured per turn. Present practice calls for a furnace of 250 lb. capacity, which uses 150 kw. and melts a charge in 6 min. A ton of brass is melted by the use of 275 to 290 kwhr. The disadvantage to the electric furnace in the matter of fuel cost is gradually being eliminated. The charge for electric energy has not changed materially in the last few years, whereas the price of oil has risen from 3c. to 8c. per gal. Electric currents at 1 1/4c. to 2c. per kw. is cheaper than oil at 8c. per gal., or gas at 55c. per 1000 cu. ft.

More than 25,000 employees of the General Electric Co. hold bonds amounting to approximately \$22,500,000 in the company's Employees Securities Corporation. The average holding of \$903 per person is an increase of \$143 over 1925, while the number of bondholders represents an increase of 5 per cent over the previous year.

# Recuperators for the Open-Hearth

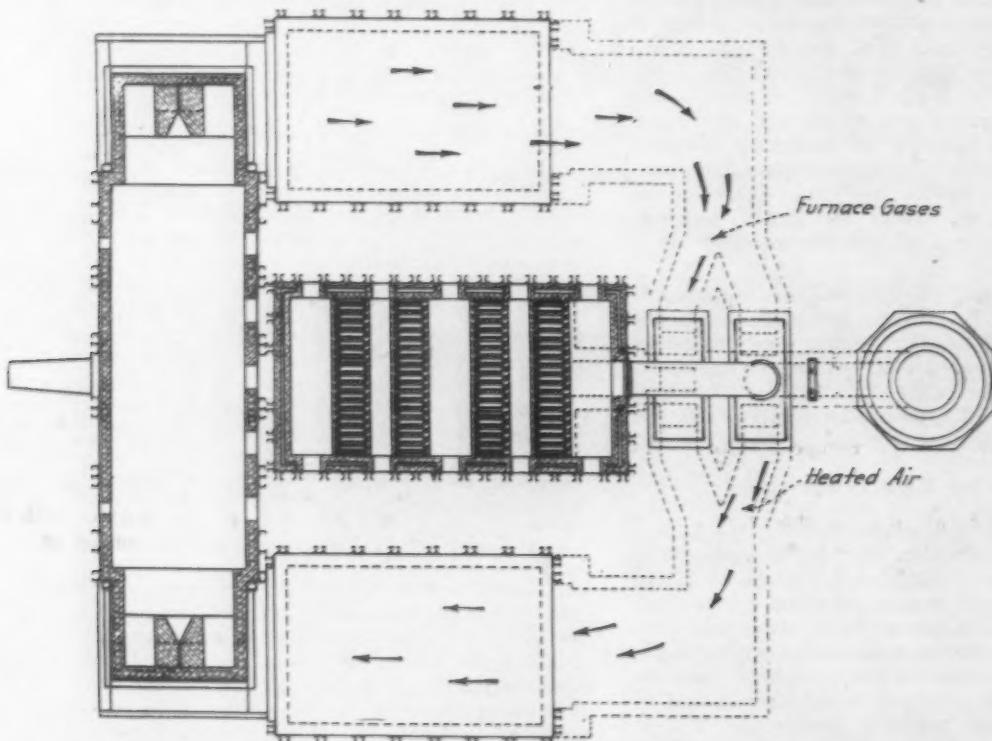
Suggestion for Recovering Part of Waste Heat Now  
Going Up Stacks—Less Fuel and More Steel Claimed  
Possible—Carborundum Used in Construction

BY W. H. FITCH

THE possibility of using recuperators for open-hearth furnaces has been a subject of discussion among operating men and engineers for several years. Those we have interviewed are divided into two classes: First, those who have waste heat boilers or prefer this means of utilizing waste heat; second, those who have no waste heat boilers and prefer to return

to 700 deg. Fahr. when entering the stack would be equivalent to a saving of 20 per cent of the fuel fired. At \$5.50 per ton of coal gasified, \$4 for coal delivered and \$1.50 for gasification, the savings would be \$23,760 per year.

In present practice, the temperature of air going to the furnaces varies greatly. This must cause a loss



Plan of a Recuperative Reversing Pit Furnace, in Which Is Installed the Fitch System of Recovery

all of the waste heat to the furnace, if possible, making it a closed cycle.

In the case of one large company, the claim is made that the use of electricity for driving mills and machinery is gradually reducing the usefulness of waste heat boilers, making the regenerator or the recuperator the only alternative. As the recuperator principle is looked upon with favor in many instances, a general discussion of the subject seems justified for the benefits that may accrue from an engineering standpoint.

We have not applied the recuperator design in question to an open-hearth furnace. We have, however, made an installation in which the temperatures are quite similar to open-hearth requirements.

## Heat That Goes Up the Stack

The quantity of heat lost up the stack of an open-hearth furnace, operating under average good conditions, without waste heat boiler, is considerable. The average temperature of these gases in furnaces of a representative plant is approximately 1400 deg. Fahr. In the case of a 100-ton capacity furnace making a heat every ten hours, and gasifying 600 lb. of coal per ton of steel tapped, the possible avoidable loss of fuel per annum, (300 working days), up the stack is 4320 tons of coal. A reduction of temperature of gases from 1400

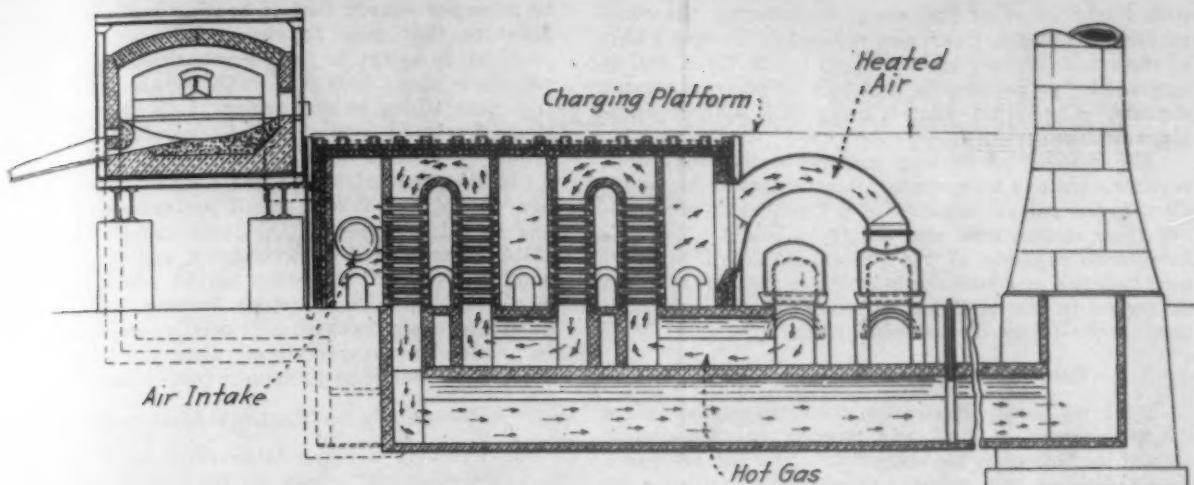
of time in making a heat. If this temperature difference can be modified and an hour can be deducted from the time of making a heat, the results would be an increase of production. This value, added to 20 per cent fuel saving, would make a substantial total saving.

Practically all furnaces in service were built with gas and air regenerator at each end of the furnace. The checker volume of each probably averages only 35 cu. ft. per ton of metal tapped. In a number of plants, where furnaces were built with checker volume of accepted good proportion, the hearth has since been enlarged. As the checker volume could not be increased, the ratio of checker volume per ton of steel tapped has been reduced to a point so that it is not economical. In some small plants, furnaces have as low as 20 cu. ft. of checker space per ton of steel tapped. In these cases, the stack temperature is obviously comparatively high.

To change the construction of existing furnaces for increasing the economy would obviously be impracticable. To build a new furnace with the present type of regenerator, of sufficient capacity to return all of the desired waste heat to the furnace, would undoubtedly be so expensive as to be prohibitive. The low efficiency of regenerators in service at the present time is recognized and understood by engineers.

The use of fuels of high calorific intensity have changed operating conditions so far as furnace design

The author is identified with the refractory division of the Carborundum Co., Perth Amboy, N. J.



*Elevation of an Open-Hearth Furnace to Which Has Been Added a Recuperator*

is concerned. Furnaces fired with coke-oven gas, tar and fuel oil do not require preheating of the gas. The preheating of air only is economically necessary. Indeed, a number of operators have expressed the opinion that it is not necessary to preheat producer gas where it can be delivered to the furnace parts at 1200 deg. Fahr.

Where fuels are adopted that do not require preheating both gas and air, checkers may be used for air only, thus substantially increasing the heating surface and temperature of air. Even under this condition, the total heating surface would not be sufficient in many cases to give the desired economical results. This last condition is the particular problem I am interested in and for which the following comments are intended.

The use of a recuperator, in combination with regenerators, is shown by the illustrations. The recuperator is added to the present furnace without any change other than flue connections for reversing valves. There is sufficient space between regenerators in all furnaces that I have studied for a recuperator of the required size.

With the checker and recuperator combination the temperature of the air entering the checkers from the recuperator would be practically constant at 1000 deg. Fahr. At reversal the checker temperature on the end in question would be maximum. This would decrease in proportion to the decrease in temperature of air going to the furnace and until the economical heat transfer limit had been reached when the next reversal takes place. With 1000 deg. Fahr. air entering the checkers the variation in the temperature of the checkers, and consequently the air passing through, would be greatly minimized over air entering the checkers from the atmosphere direct. Advantageous results in the temperature of the furnace are apparent.

The use of a screen or checker chamber before the recuperator is desirable for the purpose of removing the oxides and dust, thus cleaning the gases before they reach the first pass of the tubes. The tubes will not

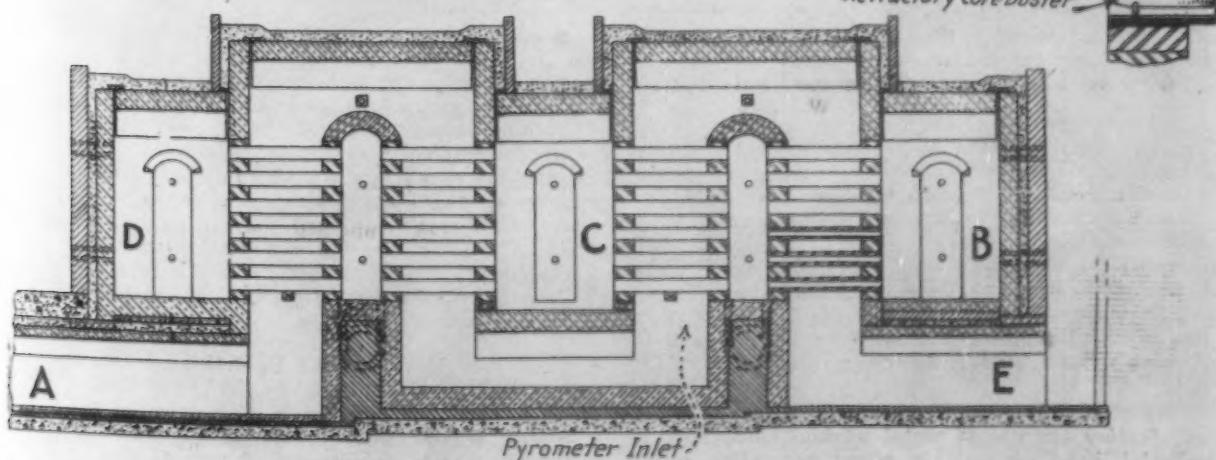
deteriorate at any temperature found in practice of this kind. Although several shapes may be used, the tubular form is very efficient for the flow of gases in recuperators. This type of construction is used in the recuperator under discussion.

#### *How the Recuperator Is Built*

The tubes, made of silicon carbide, are treated, protecting them from oxidation. This type of tube permits the maximum rate of heat transfer per square foot of heating surface per degree and hour. The tubes are made in one piece. There are no joints in the tube surface exposed to the direct action of the furnace gases, hence the possibility of leakage is reduced to the minimum. The tube ends are effectively sealed by cementing. The tubes are installed after the tube terminal walls are erected. The tube terminal walls are special shapes made of fireclay, and designed to facilitate the removal of tubes. This construction affords a chamber or compartment between tube banks large enough to admit a man for tube inspection and removal if necessary.

"Core busters," as shown in one illustration, are employed to compel the air to pass in contact with the wall of the tube. The "core busters" consist of solid cylinders made of fire clay. Legs are fitted for centering them in the tubes. "Core busters" are used in all of the tubes. They are made in three sections each 17 in. long. The center section is made of uniform diameter, while the end pieces are pointed to facilitate the flow of air into and out of the tubes.

The recuperator heating surface, illustrated in the open-hearth furnace, is approximately 7500 sq. ft., or 111 sq. ft. per 1,000,000 B.t.u. fired per hr. This requirement is based on the gas from 500 lb. of 13,500 B.t.u. coal entering the furnace per ton of steel poured,



*General Details of the Fitch Carbofrax Recuperator*

with temperature of furnace gases entering the recuperator at 140 deg. Fahr. and reduced to 700 deg. Fahr. at the stack. A loss of heat equal to 100 lb. of coal is estimated for gasification of coal. This recuperator capacity is based on what is being done with recuperators now in service.

The amount of heating surface in the total unit, regenerators and recuperator, is estimated to be equivalent to the cubical capacity of a regenerator of standard cross section area and 122 ft. in length. The difference in capacity of the present standard regenerator and the proposed combination is explained by the difference in the kind and thickness of the materials used in the design of the recuperator.

#### *How the Recuperator Functions*

Referring to one illustration, the furnace gases enter the recuperator at "A," and pass in one direction—around the tubes—to the stack "E." The furnace gases pass the tubes in a vertical column, thus utilizing all of the heating surface of the tubular members. The air for combustion passes through the tubes entering at "B," intermingling at "C" and leaving at "D." The combustion air flows continuously in one direction through tubes. After passing through the tubes the air is reversed from one end of the furnace to the other alternately as required.

Two of these recuperators were installed in a double chamber car type kiln for the manufacture of face brick at the Summerville, Pa., plant of the Hanley Ceramics Co., about a year ago. Each half of the kiln has its recuperator, which is located about 150 ft. from the discharge end. The recuperators were designed for natural gas fuel and to deliver the waste gases to a dryer at about 500 deg. Fahr. As a matter of fact, the recuperators at the Hanley plant were designed for furnace gases entering the first pass of the recuperator at 2000 deg. Fahr., whereas this temperature has not exceeded 1400 deg. Fahr. approximately.

An interesting and important factor in the operation of these recuperators is that practically no leakage has been discovered between the passageways for furnace gases and combustion air, in recuperators that have been in service practically one year. This is undoubtedly due to the fact that the coefficient of expansion of silicon carbide is only slightly below that of fire brick; that the change in volume with change in temperature in this practice is almost negligible.

There is not much difference of opinion among operators as to the advisability of using gases under pressure in the operation of a recuperator, if the design will permit. Production is the all important item. To have a furnace that can be put in operation quickly, and not dependent upon stack draft, is an advantage that is looked upon with favor.

In applying a recuperator to the open-hearth furnace, it is expected higher furnace gas temperatures than 1400 deg. Fahr. will be met with eventually, and after the true value of the recuperator is known. In the case of higher temperatures, the rate of heat transfer will be much greater than found at 1400 deg. Fahr. However, this is an advantage, in that more work can

be done per square foot of heating surface. The temperature that may be expected is not considered a problem, in so far as the decomposition point of silicon carbide is above 4000 deg. Fahr. There are no physical transformations at any temperature below decomposition. Certainly not at any temperature that may be found in practice of this kind.

In the event of a tube becoming damaged, the leakage of air would be a small percentage of the total and would mingle with the stack gases. In all probability it would not be perceptible, and the leak remain undiscovered until inspection period. As it is necessary in present practice to repair furnace walls and roof, as well as clean checkers periodically, ample time would be provided for inspection of tubes, and the life of the recuperator could be prolonged indefinitely.

#### *Dust as a Possible Limitation*

In applying a recuperator principle of this design to an open-hearth furnace for the manufacture of steel, the only limitation appears to be the quantity, temperature and nature of dust that may be deposited on the tubes. With 1400 deg. Fahr. temperature of furnace gases entering the recuperator, the temperature of the walls of the lower tubes will not exceed 1150 deg. Fahr. in the first pass and an average of several hundred degrees for the recuperator, therefore, well below the temperature of the plastic state of dust, and consequently this may be removed by the use of soot blowers as is the case in boiler practice. This method has proved effective where pulverized coal is used as fuel in boiler plants of modern design, and using coal of comparatively high ash contents—600 lb. of ash per hour projected into the fire box is quite common in this practice. If 20 per cent of this ash is precipitated on the tubes and settings, 120 lb. would be removed periodically.

An open-hearth furnace fired with coke-oven gas and boiler fired with an equal value of fuel in the form of pulverized coal, per unit of time, is not an exactly comparative case, due to the difference in nature of the non-combustible substances found in the flue gases. However, if the quantity only is to be considered, the dust in the case of the boiler is many times that to be found in the open-hearth furnace, and is comparative.

The temperature of the furnace gases in the first pass of tubes would be about 1400 deg. Fahr. on an average as first explained, 1100 to 1200 deg. Fahr. below the minimum corrosion temperature referred to; so one is justified in concluding that serious reaction would not result due to use of silicon carbide in the manufacture of tubes.

On a basis of 0.259 g. deposit per 100 cu. ft. of gases and 6000 lb. of coal gasified per hour and all of the gases of combustion passing out of the stack at 1400 deg. Fahr. as in present practice, there would be 1.41 lb. of dust deposited per hour on the recuperator tubes if it all stopped there. Undoubtedly, a smaller percentage is actually deposited and this removed at blowing intervals, an almost negligible quantity compared with the results of boiler practice using pulverized coal as a fuel.

#### **Steel and Power Exhibition at Toronto**

Canada's first steel and power show will be held in the new Varsity Arena at Toronto on Aug. 31, Sept. 1 and 2, simultaneously with the long established Canadian National Exhibition. The steel and power show is backed by the Montreal and Toronto chapters of the American Society for Steel Treating; Canada Council, Toronto Council and Hamilton Council of the Universal Craftsmen's Council of Engineers; Toronto and Hamilton organizations and the Dominion executive of the Engineers' Mutual Benefit Fund, and the Toronto branch of the American Electroplaters' Society.

Many of the exhibits will be in operation. They will feature the use of metal working, heat treating, materials handling, welding, power generating, refrigerating, ventilating and electrical equipment. Exhibits

will be made of high-speed carbon and alloy steels, bearings, refractory and heat insulating materials, packing, water treatments, and power and lubricating oils. Technical sessions are appointed for the three days and papers are scheduled on heat treatment, machine shop and power plant practice, high-speed steels, corrosion resistance, coal pulverizing, materials handling, welding, heating and ventilation. The general chairman, C. Bradshaw, 153 University Avenue, Toronto, reports that 40 per cent of the available exhibition space is now taken.

A pamphlet on "The Evolution of Overhead Accounting" has been issued by the Department of Manufacture of the Chamber of Commerce of the United States, Washington. E. W. McCullough, manager of the Chamber's department of manufacture, promises to send a copy to any executive requesting it.

# Rolls Wide Range of Products

Mill at Wisconsin Steel Works Is Equipped to Produce Universal Plates, Structural Shapes, Rounds, Squares and Flats

BY ROGERS A. FISKE

THE list of steel products that can be rolled on the new No. 5 mill of the Wisconsin Steel Works, South Chicago, Ill., reminds one of a number of pages taken from a warehouse catalog. A buyer's requirements may call for 5-in. to 13-in. channels, 2-in. to 5½-in. rounds and 3 x 3-in. to 6 x 6-in. angles: if so, the sections are rolled on the No. 5 mill. An order may be made up that calls for universal plates, 6½ in. to 30 in. wide up to 1½ in. thick, I-beams up to 8 in., 5½-in. squares and forging flats, 4½ in. to 8 in. x 2½ in., all of which can be rolled on the No. 5 mill. It is, in fact, a "mill of many trades."

It was designed to occupy a limited space and to roll as wide a range of products as possible with the least capital expenditure consistent with the installation of high-grade equipment. The operators of the mill look upon it as one that will keep invested capital working at or near top speed all the time. It is not planned to gage production by the day, week or even the month, but by the year. In other words, it is production over the period of a year, not records established during short periods, that shows true economy and profit.

The owners believe that a mill universal as to character of product and installed with a relatively small outlay of money can be operated at a more uniform rate, year in and year out, than can a group of mills making the same range of products. This installation

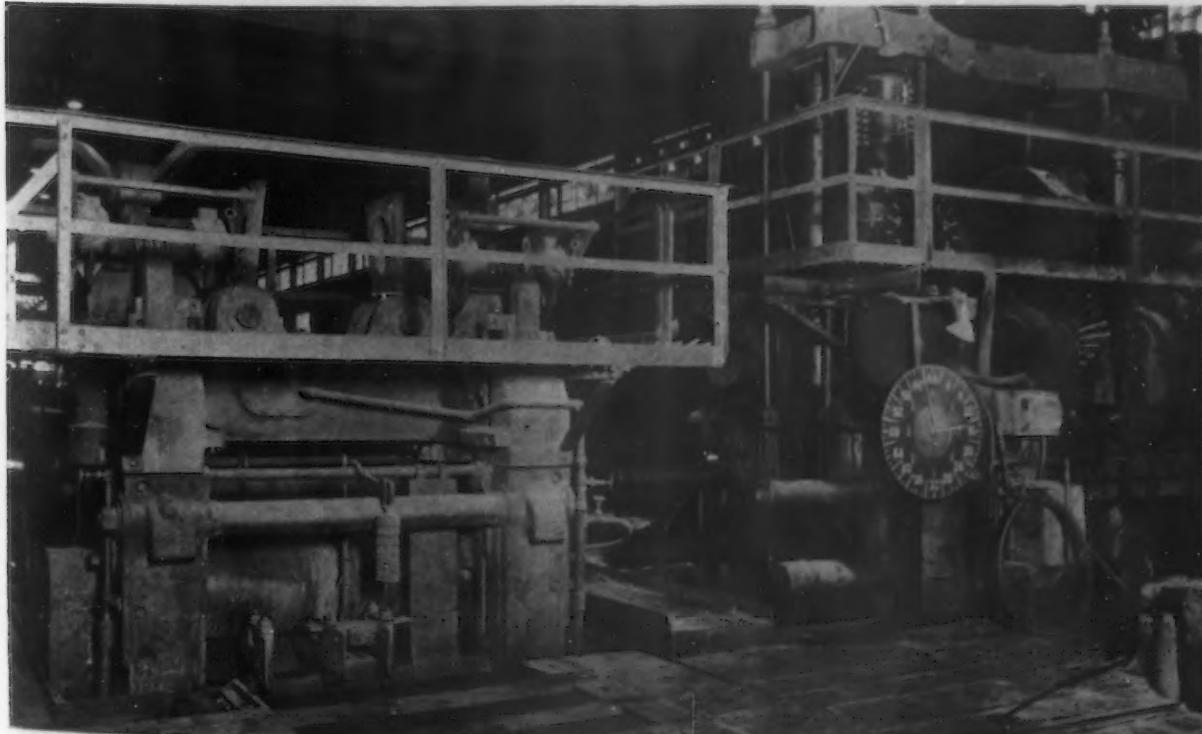
The author is Western Editor, THE IRON AGE, Chicago.

may be characterized as a 30-in. universal plate mill, a light structural mill, and a 24-in. bar mill for rounds, squares and flats.

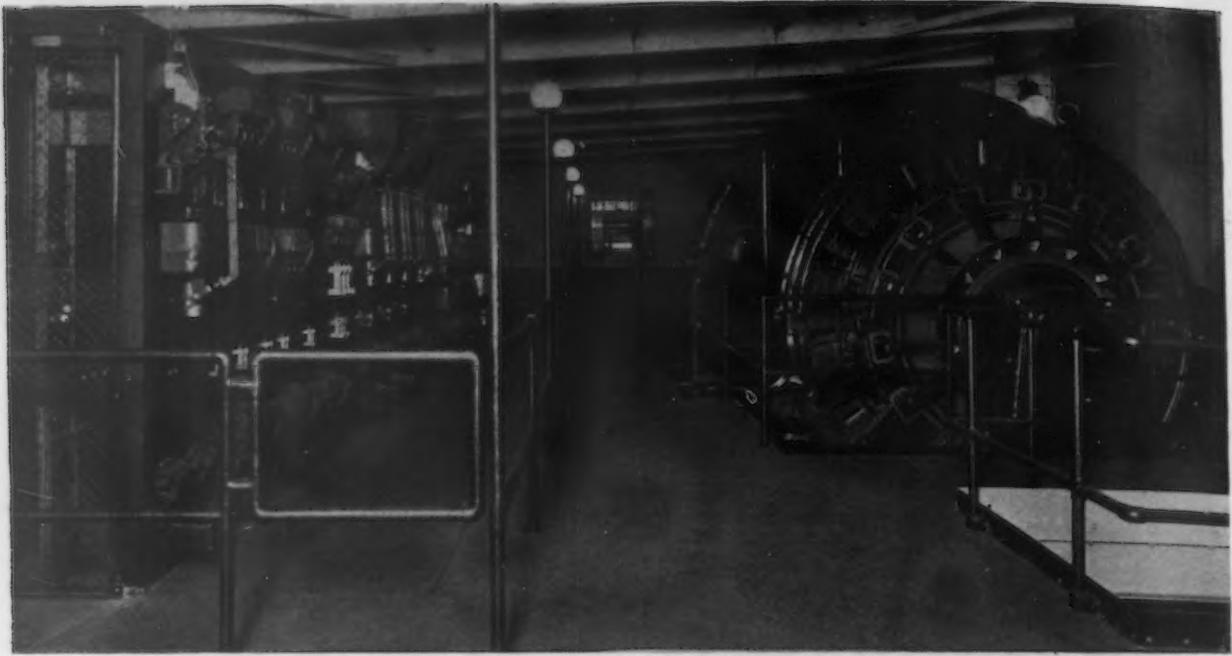
The No. 5 mill extends north and south for a distance of 745 ft. At the south end it terminates at a billet storage dock, on the opposite side of which stands an electrically driven blooming mill that was completed in the fall of 1925. The new mill is adjacent to merchant mill No. 4, which in turn stands next to mill No. 2. Mill buildings Nos. 2, 4 and 5 terminate at the north end in a newly constructed shipping building, which is 100 x 418 ft. Standard-gage tracks and loading docks are provided at the east and west ends of the shipping room, and the entire floor space, a portion of which is occupied by two shears for the No. 5 mill, is served by two double-trolley overhead electric traveling cranes.

## Electrical Units Provide Wide Latitude of Operation

The main electrical units, all of which were furnished by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., are five in number. Included is a flywheel motor-generator set, consisting of two 3000-kw. direct-current generators driven by a 2200-volt 3-phase 60-cycle motor, which is rated at 6500 hp. One generator feeds a 3100-hp. reversing motor, which drives the universal mill and the No. 2 stand of rolls. The second generator supplies power to three 2000-hp. adjustable-speed motors, which drive stands Nos. 3 to 7,



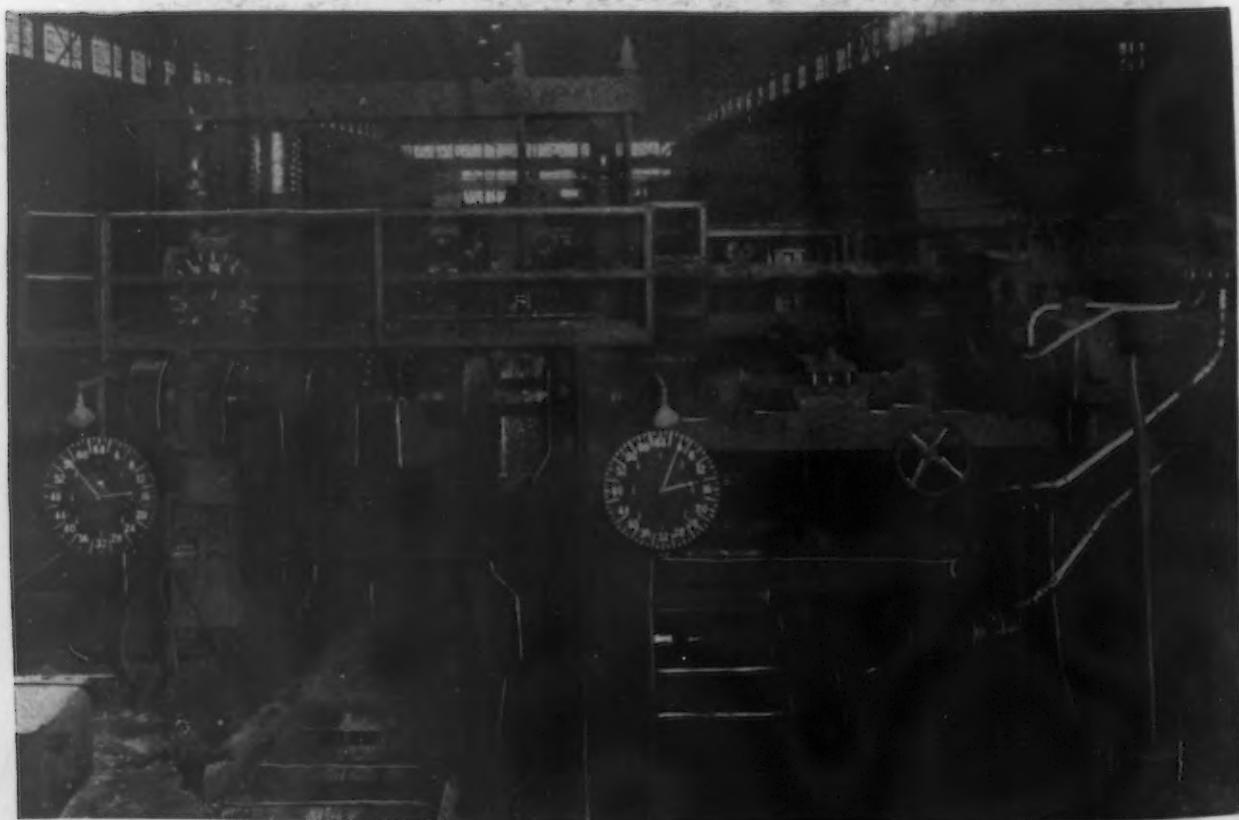
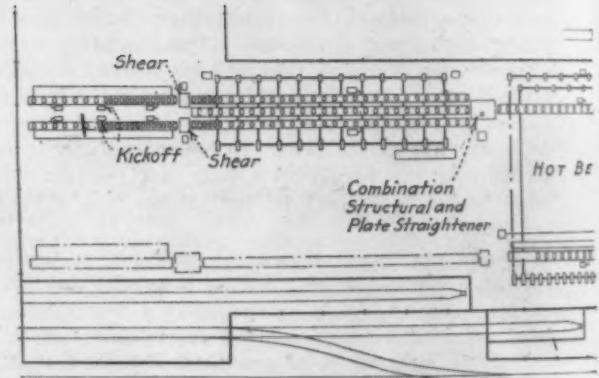
The No. 2 Stand, Which Is a 27-In. Reversing Roughing Mill, Is Driven from the Same Shaft as the Universal Mill (Shown at Right). Crane lugs are provided on the No. 2 stand so that it can be removed and a section of floor can then be placed over its foundation



*The Flywheel Motor-Generator Set (Above) Is Designed with Two Generators. One drives the 3100-hp. reversing motor and the other provides current for the motors on stands Nos. 3 to 7, inclusive*

*(At Right) An Aiken Cooling Bed Serves the Universal Plate Mill. Two 75-ft. cooling beds are provided for sections that are finished on No. 7 stand. A single line of roller tables delivers the product to shears, which are located in the shipping building. The mill building is 745 ft. long*

*The Universal Mill (Below) May Be Used as a Break-Down for Heavy Sections. The vertical rolls may be moved back to provide a 59½-in. clearance, and the housing is designed for the insertion of large-collared rolls*



grouped as follows: Nos. 3 and 4 on one motor, Nos. 5 and 6 on the second motor, and No. 7, which is the finishing stand, on the third motor.

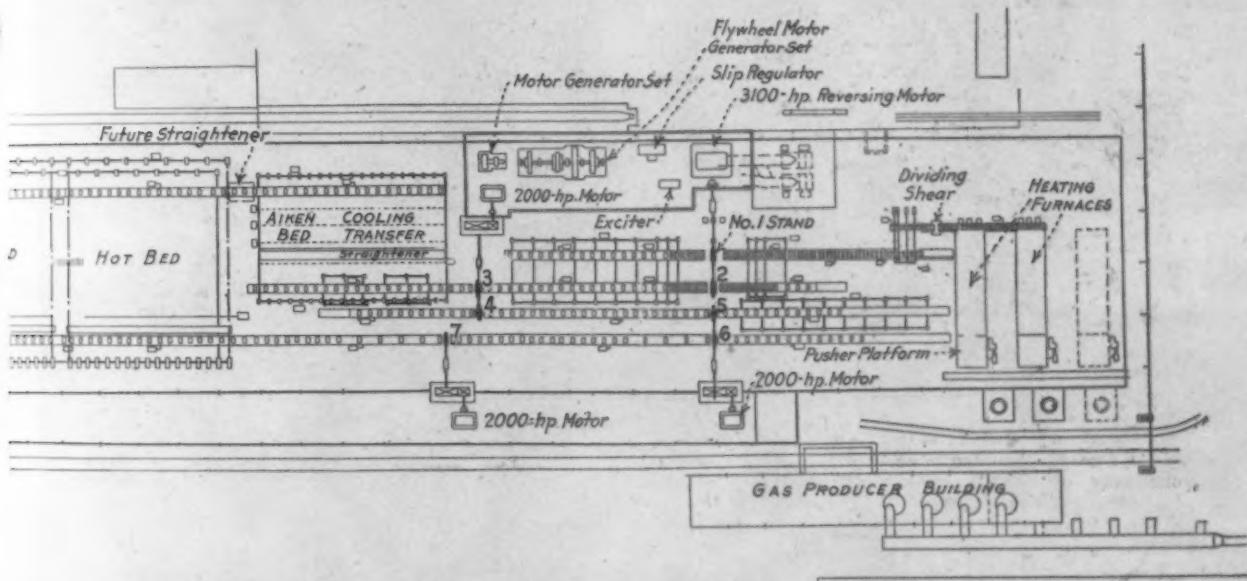
The main motor drives are controlled by the Ward-Leonard system. The control of the reversing motor on the universal mill is similar to that of modern electrically driven, reversing blooming mills. The five stands of 24-in. non-reversing rolls have a speed range from zero to a maximum of 200 r.p.m. by reason of their being driven by a separate generator, which is provided with the Ward-Leonard system of motor control. The slow speeds are an advantage when rolling large rounds, and the high speeds are necessary when making thin flats. In addition to these units there is a 1000-kw. motor-generator set that supplies 250-volt direct current to the auxiliary motors and cranes throughout the mill.

Two heating furnaces for billets and slabs have been installed, and space has been provided for a third unit, should it be required in the future. Each furnace, which is 14 ft. wide x 56 ft. long inside, is equipped with fuel-burning devices so that it may be fired with either coke oven gas or oil. The furnaces were built by Alex. Laughlin & Co., Pittsburgh. Two

stand, which can be used as a one-pass finishing stand for universal plates. Finished plates are passed on to an Aiken edge-straightener hot bed. The universal mill may also be used in conjunction with the No. 2 stand as a break-down for large beam sections, or it may be used for the first passes for plates varying in width from 6½ in. to 16 in., which are finished in the 24-in. mill with vertical edging rolls in place.

A heavier tonnage of narrow plates can be produced in a unit of time when using the 24-in. mill than when finishing on the universal mill. One advantage that is strongly in favor of the multiple use of the No. 1 mill is that it can be in full operation on the production of universal plates during periods when it is necessary to change rolls or make repairs to stands Nos. 2 to 7 inclusive.

The No. 2 stand is a two-high 27-in. reversing roughing mill, the rolls of which are connected by spindles and couplings with the rolls of the universal mill. In other words, both of these stands are driven by a common motor. Special crane lugs are provided on the No. 2 stand so that it can be removed by the overhead crane when rolls are being changed in the universal mill. If No. 2 is not in operation, the coup-



200,000-gal. tanks are used for the storage of fuel oil, which is handled by steam-operated pumps through a return system of piping. The furnace dampers are operated by electric motors.

At the charging ends of the furnaces billets are placed on skids by a 15-ton magnet crane, furnished by the Morgan Engineering Co., Alliance, Ohio. The pushers are electrically operated and are paired so that two parallel lines of billets may be fed through each furnace at the same time. As a heated billet is pushed from a furnace it falls on the furnace table and is delivered to a hydraulically operated dividing shear. This table extends beyond the shear to a transfer that delivers billets to the approach table to stand No. 1, which is a two-high 30-in. universal plate mill with 27-in. rolls. The housings of this mill are of a special design that allows the vertical rolls to be moved back so that they will be in the clear when the mill is used as a break-down stand for beam and other sections. The maximum clearance obtainable is 59½ in. A 47-in. window is provided in the housing so that structural rolls with large collars may be used.

The No. 1, or universal, mill may serve any one of several purposes. It may be used for the production of universal plates in widths ranging from about 6½ in. up to 30 in. In this case the finished product moves down the run-out table from the No. 1 stand and is then transferred to the approach table of the No. 3

lings between it and No. 1 can be broken. In such a case No. 2 either can remain idle, or it can be removed and a section of floor placed over its foundation.

The run-out table from No. 2 feeds to the rolls of No. 3, which is a 24-in. two-high stand in so far as its practical operation is concerned. The housing of No. 3, however, is designed three-high, but it is a single-pass mill and only the two top rolls are used for section reduction. The bottom roll is a dummy by means of which the lower roll of stand No. 4 is driven.

The product, having been given one pass in No. 3, is kicked down to the approach table of No. 4, which is a 24-in. two-high stand. The top roll of No. 4 is driven through the middle roll of No. 3. The 2000-hp. motor that drives stands Nos. 3 and 4 has an adjustable speed of 230 to 460 r.p.m.

After having been given a single reduction in No. 4, the section travels up a slightly inclined approach table, passes through, in the case of plates, an 18-in. vertical-edging set and is delivered to stand No. 5, which is a 24-in. two-high mill. The section is kicked down from the run-out table of No. 5 to the approach table of No. 6, which is a 24-in. three-high stand. The two last-named stands are in line and, like Nos. 3 and 4, are driven by a 230 to 460-r.p.m. 2000-hp. motor. The drive between Nos. 5 and 6 is similar to that between Nos. 3 and 4 except that in this case the two lower rolls in the stand nearest the motor (No. 6) are

used for reduction of area. The top roll of No. 6 is a dummy acting only as a means for driving the top roll of No. 5. The lower roll of No. 5 is driven through the middle roll of No. 6.

#### Vertical Edging Sets Provided for Finishing Flats

The section, upon leaving No. 6, travels up an inclined table to a two-high 24-in. finishing stand, which is designated as No. 7. Just ahead of No. 7 is an 18-in. vertical edging set which is used when thin flats or plates are being rolled. The finishing stand is also driven by a 2000-hp. 230 to 460-r.p.m. motor. Two hot beds serving the 24-in. mill are each 75 ft. wide.

The groups of drives, the arrangement of mills, the location of transfers and the various levels of approach tables are outgrowths, in some measure, of the necessity to conserve space. The edging sets ahead of stands Nos. 5 and 7 are equipped with adjustable rolls.

on a scale platform. When a cradle is loaded, its net weight is recorded and an overhead crane takes the finished product to storage or to railroad cars.

The contract for all of the mill machinery on this job was placed with the United Engineering & Foundry Co., Pittsburgh. That company later sublet the building of the universal mill and the second stand of 27-in. rolls, together with their tables, to the Mackintosh-Hemphill Co., Pittsburgh. The tables, starting with the approach to No. 3 and including the delivery table at No. 7, are driven by mill-type motors designed for a speed range of 2 to 1.

Scale is washed from under all rolls and tables to three pits, from which it is removed by a bucket attached to one of the mill cranes. The roll shop is equipped with a 30-in. x 14-ft. grinder and five roll-turning lathes.

The Morgan Engineering Co. furnished the main



*The Furnaces Are Equipped with Oil and Gas Burners. The dampers are motor-operated*

Each edger is driven by a 175-hp. 350 to 900-r.p.m. motor. The three 24-in. mill drives and the two edging sets are controlled from one pulpit.

It should be noted that transfers have been provided so that all approach and run-out tables are at right angles to the axes on the mill rolls, thus avoiding the diagonal tables of cross-country mills with three-high stands of rolls. Further, the run-out tables from Nos. 1, 3 and 7 are at the same level, thus bringing the three hot beds to the same grade and permitting the use of a single delivery table to the shears. This table extends along the east side of the hot beds and feeds through angle and flat straighteners, which are portable and may be replaced by a section of table. Beyond the straighteners is a transfer, which feeds on either side to parallel roller tables, each of which delivers to a 1,000,000-lb. shear. The straighteners are driven by a 175-hp. 350 to 900-r.p.m. motor, and each shear is powered by an 80-hp. 400 to 800-r.p.m. motor. The shear gages are motor-operated, and as each piece is cut it is kicked off the table into a cradle that stands

mill crane, which is equipped with a 60-ton main hook and 15-ton auxiliary hook. A 15-ton roll-shop crane, two 10-ton double-trolley cranes in the shipping room and a 15-ton roll-storage crane were supplied by the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

The mill lubricating system was installed by S. F. Bowser & Co., Inc., Fort Wayne, Ind. Three separate oil filtering units are provided. One unit furnishes oil to the gears and the bearings on the universal mill, and the second unit distributes oil to the three sets of reduction gears and bearings and also to the pinion gears and their bearings on stands Nos. 3 to 7 inclusive. A third system serves the bearings on the 3100-hp. motor and the flywheel motor-generator set.

The oil used on both the universal mill and the reduction gears and pinions is heavy and will congeal in cold weather. All oil lines, both to and from the various units and bearings are heated with low pressure steam pipes incased in the insulation covering the oil pipes. Each receiving tank, filter and pressure tank is provided with heating coils.



# Round Bars Finished by Centerless Grinding

*Surface Defects Removed and Bars Ground True to Size Within 0.0005 In.—Use of Process Extended to 4-In. Diameter Stock*

BY J. E. CASTER\*

FOR a number of years, the only practical methods of finishing hot-rolled round steel bars was either by cold drawing or by turning and polishing. By the use of these processes many tons of bars of all sizes have been finished yearly at low cost.

With the development of the centerless grinder, in recent years, it has been found possible to finish round steel bars of high-carbon and high-speed steel to an accuracy previously regarded as impossible, at the same time, removing any surface defects and decarburized skin, which might result from the process of cold drawing the bars.

Many tons of high-chrome or stainless steel bars, which are later forged or turned into various shapes, are ground annually for the sole purpose of inspecting the soundness of the bar. This inspection is sure and rapid, and is of value to the manufacturer of stainless steel in that it saves transportation costs and retains satisfied customers by keeping the defective material in his own plant. The customer, in turn, saves money by the elimination of labor formerly wasted in working on defective bars.

#### Basic Principles of Centerless Method

The first installations of centerless grinders were for finishing cold drawn bars of high-speed and other alloy steels. The steel is generally hot rolled, pickled, given one pass through the cold drawing die, annealed and accurately straightened before going to the grinding machine. It is very essential that these bars be straight, and the larger the diameter of the bar, the straighter it must be, because the small bars have a degree of flexibility not found in the stock of larger diameter. It is useless to attempt to grind a bar on a centerless grinder if it is not straight, and it must be straight up to the very end.

\*Engineer, Cincinnati Grinders, Inc., Cincinnati.

Although the functioning of the centerless grinder is generally known, a brief review of the principles of operation should help in a better understanding of the following outline of its application to the finishing of round-steel bars. There is a grinding wheel mounted in a fixed housing and driven either directly from the motor or from a drive shaft in the machine frame. This wheel revolves at standard grinding speeds approximating 5000 to 6000 ft. per min. Directly opposite the grinding wheel, mounted on a separate slide, there is a smaller wheel, known as the "feed" or "regulating" wheel. The machine is arranged so that this wheel can be tilted and its axis placed at any angle from zero to 7 or 10 deg. relative to the axis of the grinding wheel spindle. This regulating wheel is driven at a much slower speed, generally from 20 to 80 r.p.m., and serves to control or regulate the rotation of the bar while it is being ground by the main grinding wheel.

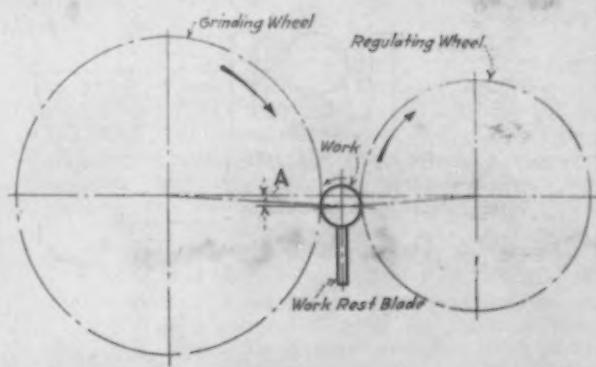


Fig. 2—The Center of the Bar Being Ground Is Below the Center of the Two Wheels

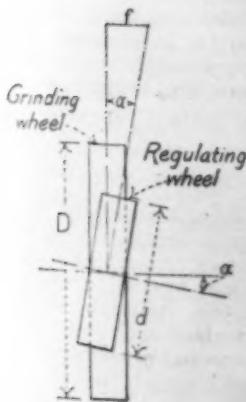


Fig. 1—The Arrangement of the Grinding and Regulating Wheels May Be Noted From Diagram at the Left

Fig. 3 (at right)—Bar Grinding Fixture Employed on the No. 2 Centerless Machine



Between these two wheels, on another adjustable slide, there is a work plate or wearing strip, generally called a "blade," which supports the bar directly at the point of grinding. The size of the bar after grinding is controlled by the distance between the grinding and regulating wheels, the adjustment for size being made by a micrometer screw and dial.

The centerless principle is illustrated in Fig. 1. The grinding and regulating wheels are plainly marked; and the angle  $\alpha$  is the angle at which the axis of the regulating-wheel spindle is placed relative to the axis of the grinding-wheel spindle. The r.p.m. of the regulating wheel in conjunction with the angle  $\alpha$  determines the feed rate of the bar being passed through the machine. If this angle is increased, or if the speed of the regulating wheel is increased, or both, the feed rate of the bar will be increased proportionately. Therefore, the centerless grinder incorporates

with long guides which extend to the front and rear of the machine. These guides are adjustable both vertically and horizontally to accommodate bars of various sizes, and should be accurately aligned in order to produce satisfactory results. They are plain strips of hardened and ground steel.

#### Bars True to Size Within 0.0005 In.

When grinding 1-in. bars, a feed of approximately 7 ft. per min. is maintained, removing 0.005 to 0.010 in. stock in the rough grinding operation. This feed is increased to about 15 ft. per min. when grinding  $\frac{1}{2}$ -in. diameter bars, removing the same amount of material. For roughing, a 502 ISI Aloxite silicate bond, or a 60-J-31 Aloxite vitrified bond wheel has been found to be satisfactory. If the bar being ground is of ordinary screw stock or machinery steel, a 40-M carbide of silicon wheel can be used. After the roughing pass the

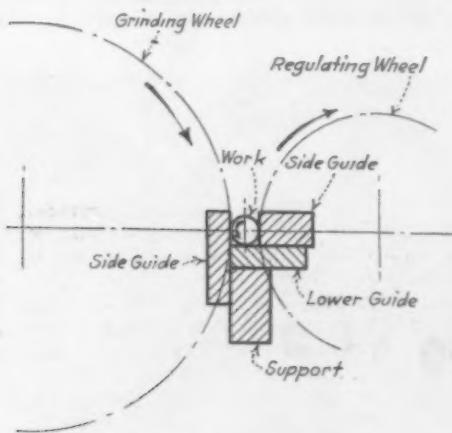
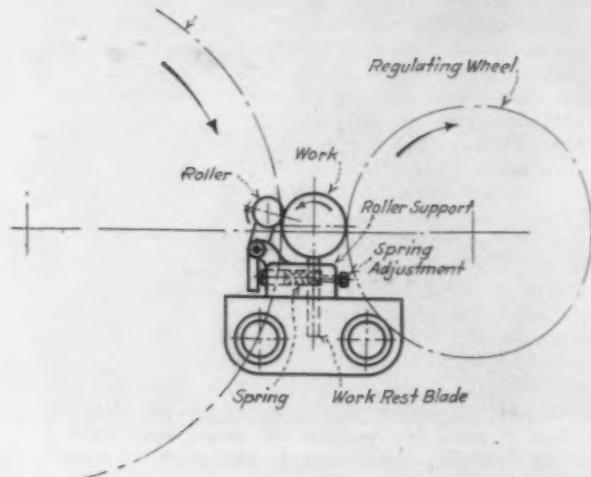
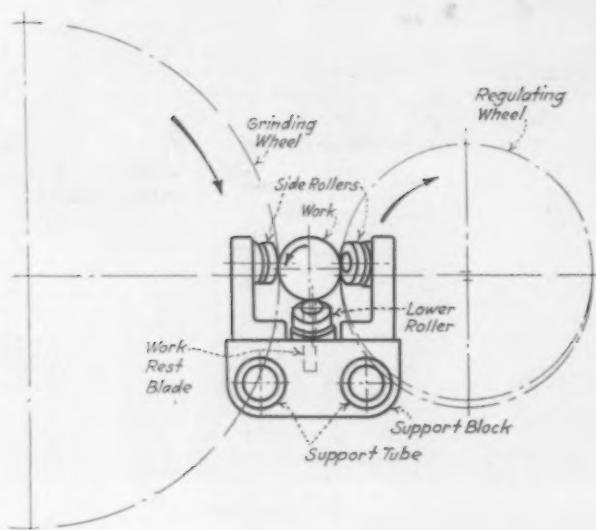


Fig. 4 (at left)—The Guides and Supports for Bar Extend from Front to Rear of the Machine

Fig. 5 (at lower left)—Fixture Developed for Large Bars

Fig. 6 (at right)—Diagram of the Feeding Action of the Bar

Fig. 7 (at lower right)—Use of Rollers and Springs in Fixture for Large Bars Assured Proper Feed



the essential elements of the ordinary cylindrical grinder; namely, means for independently varying the rate of rotation and traverse of the work.

The relation of the work being ground to the work-support blade and to the wheels may be noted from Fig. 2. This relationship has been exaggerated in order to show that the center of the bar being ground is placed slightly below a line drawn through the centers of the two wheels. This distance,  $A$ , below center, is generally about  $\frac{1}{4}$  in. from the center of the work to the center of the wheel. This placement of the work is contrary to the usual practice on centerless grinding machines, but is necessary in order to eliminate the whipping or chattering which might result in the grinding of a bar having slight kinks or bends that have not been entirely removed in the straightening operation. By grinding in this position the bar is held firmly down on the blade, due to the action of the wheels.

The bar grinding fixture employed on the No. 2 centerless grinder, which is used for drill rods and screw stock, is shown in Fig. 3. This fixture is made

bars are put through the machine again at the same speed, removing about 0.002 in. stock, which produces a bar the entire length of which is true to size within 0.0005 in. The finished bar is round and has a very high grade finish. For finish grinding small diameters, a rubber bond wheel of about 80 grain can be used, and very good results have also been obtained in finish grinding the larger bars,  $\frac{1}{2}$  in. to  $1\frac{1}{4}$  in. diameter, by using the abrasive wheels recommended above for rough grinding. These figures give some indication as to the production possibilities of the centerless grinder on the smaller size bars.

#### Screw Stock or Machine Steel Ground

After a number of machines were in successful operation on drill rods, steel finishers began to experiment with the grinding of screw stock or machine steel. There was not the problem of seams or pits to worry the steel maker when handling this material, which could be easily finished by the turning and polishing or the cold drawing methods. However, the advantages of the grinding process soon became evident on this

class of work, and the users of such steel began to specify ground stock for screw machine and other work. A number of manufacturers buy the ground steel in special sizes, which permits them to cut off the bar to the required length and assemble the shaft directly into the machine. An undersized bar, say 0.001 in. to 0.002 in. under nominal diameter, could be assembled in a hole which had been reamed with standard reamers. One automobile manufacturer is at present buying stock which is regularly furnished standard to 0.001 in. plus, and is maintaining special reamers rather than pay the extra price for special sizes. In accuracy and finish, the ground screw stock is better than the cold drawn bar and the ease in obtaining special sizes without extra die cost appeals to the steel finisher as well as the user. The latter undoubtedly would ask for more special sizes if he knew that he could get them.

#### Machines and Fixtures for Grinding Bars Up to 4 In. In Diameter

The average size of bars of screw stock or machinery steel is larger than the ground bars of high-speed and other alloy steels. Since the steel finishers were successful in grinding the drill rod and small size screw stock, demand naturally arose for a machine to handle the larger bars, up to 4 in. in diameter. In developing equipment for the grinding of bars over 1½ in. in diameter several problems had to be solved. First, the larger work was too heavy and required a heavier and more powerful machine than the No. 2 grinder used for the smaller bars. With the introduction of the No. 3 centerless grinder, a machine with the necessary power became available, but a second obstacle was then discovered in that the regular type of bar grinding fixture, used on the No. 2 machine, was not satisfactory when grinding the larger work. Fig. 4 shows the guides and supports for the bar, which extend to the front and rear of the machine. These are adjustable strips of hardened steel, and the bar, as it rotates and feeds along, must slide over the surface. The average weight of a 4-in. bar is about 43 lb. per ft., and with bars of this size it was found that the resulting friction between the bar and the guides was sufficient to prevent rotation and feed of the bar unless exceedingly heavy cuts were taken. These heavy cuts make it impossible to finish grind a bar, because the wheel would break down so rapidly that the finish of the bar would be impaired and would not pass inspection. Furthermore, the wheel wore so rapidly on the heavy cuts that accurate size could not be maintained throughout the length of the bar.

#### Different Fixture for Grinding Larger Bars

The elimination of this friction between the work and the guides, experienced with the No. 2 type fixture, was the principal object in developing the large fixture shown in Fig. 5. In this design, the bar rests upon rollers mounted in anti-friction bearings and is guided between rollers similarly mounted. These rollers are placed at a slight angle to the axis of the bar and offset slightly as to the relation of the center of the roller to the center of the bar. In this way a feeding effect is obtained as the bar rotates. This action, in principle, is exactly the same as the feed or regulating wheel action described above, and shown in

Fig. 1, excepting that in this case the face of the feed wheel, or roller, is used instead of the periphery. The feeding action of the bar as it is rotated is shown in Fig. 6. Since the energy to rotate the bar is derived from the grinding wheel, but regulated and controlled by the feed wheel, it follows that the elimination of as much friction as possible when dealing with heavy bars will permit of lighter cuts, and thereby obtain better finishes.

#### Large Grinding Wheel For Larger Bars

In spite of all the precautions taken to provide a fixtures that minimized the friction, it was found that the slight kinks and low spots on the bar would cause it to stop rotating. To overcome this trouble two rollers, one placed on either side of the grinding wheel, as shown in Fig. 7, are pressed by means of a spring against the bar being ground. In this manner, sufficient pressure is obtained upon the regulating wheel to rotate and feed the bar through the machine, although the grinding wheel is not touching the work. In this, a fixture was obtained which would control the work, feed it through under any depth of cut, however small, and produce accurate, and highly finished work.

In order to obtain this desirable result on a bar 3 in. in diameter, it was necessary to consider the large amount of stock which was being removed, and to provide means for eliminating, as much as possible, the wheel wear that naturally resulted from the large stock removal.

An idea of the problem may be obtained by the following comparison. The stock removal on a 3-in. diameter bar 20 ft. long, in reducing the diameter, 0.005 in., is equivalent

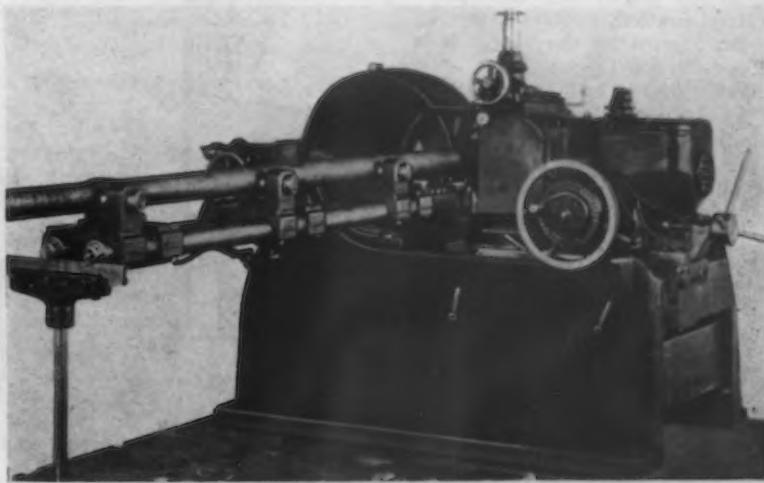


Fig. 8—The No. 3 Centerless Grinder for Large Bars, Is Equipped With a 24-In. Diameter, 6-In. Face Grinding Wheel. A 3½-in. bar is mounted in the fixture shown

to grinding over 200 1-in. diameter by 3½-in. long piston pins, removing the same amount of stock. Therefore, any adjustment for size which may be necessary when grinding 200 pins, will be necessary for each bar being ground. The natural solution was to increase the diameter of the grinding wheel. Therefore the No. 3 centerless grinder for bar work is regularly equipped with a wheel 24 in. in diameter and 6 in. wide, and there is no difficulty in obtaining a bar that is within the required limits throughout its length.

Fig. 8 is a general view of the machine, showing the work supporting fixture, or table, with a 3½-in. bar mounted in position to be ground. The action of this machine is exactly the same as that of the No. 2 grinder described above. By using this method, bars 3½ in. in diameter have been finish ground from rough turned stock, round within 0.0002 in., and true to size within 0.0005 in., their entire length. In "trueness" the ground bar is much better than a turned and polished bar, and the finish is superior to the cold drawn product. A further improvement in the finish can be made by a pass through a polishing machine of the skewed-roll type, which produces an excellent surface but does not change the diameter of the bar. Three passes are usually required on work of this size, about 0.004 in. to 0.005 in. being removed at each pass. The production per pass is about 6 ft. per min. and it is possible to obtain a net production of approximately 1 ft. per min.

The demand for finish ground bars of the larger sizes is increasing rapidly and the users of this mate-

(Concluded on page 978)

# Announce Standardized Spindle End

Milling Machine Manufacturers Adopt Common Design,  
Which Promises Economies for Users—Complete Set of New Arbors Developed

**S**IGNIFICANT savings both to the users and the makers are promised by a new design of spindle end for milling machines, which has been standardized and adopted recently by the milling machine manufacturers' group of the National Machine Tool Builders' Association.

The standard adopted provides complete interchangeability of all arbors and face milling cutters for any size or make of horizontal, vertical, duplex, or manufacturing milling machine from 2 to 25 hp. capacity. The elimination of the large number of sizes and varieties of milling arbors and cutters now in use, made possible by this simplification, reduces markedly the cost of the equipment carried by the user. It is estimated that approximately 250 arbors of different manufacturers will now be replaced by 16. A feature of the new spindle end is that it provides for the adaptation of most of the old equipment by the use of standardized adapters.

The group which cooperatively developed the new standardized spindle end includes the following manufacturers: Brown & Sharpe Mfg. Co., Providence; Cincinnati Milling Machine Co., Cincinnati; Hendey Machine Co., Torrington,

been regarded by milling machine makers as a competitive sales feature and were therefore a basis of commercial rivalry. Each manufacturer had an individual design, often with two or more sizes, and a further obstacle to standardization was that many of these constructions were patented. In the final standardization of this competitive feature, due credit should be given to the spirit of compromise growing out of

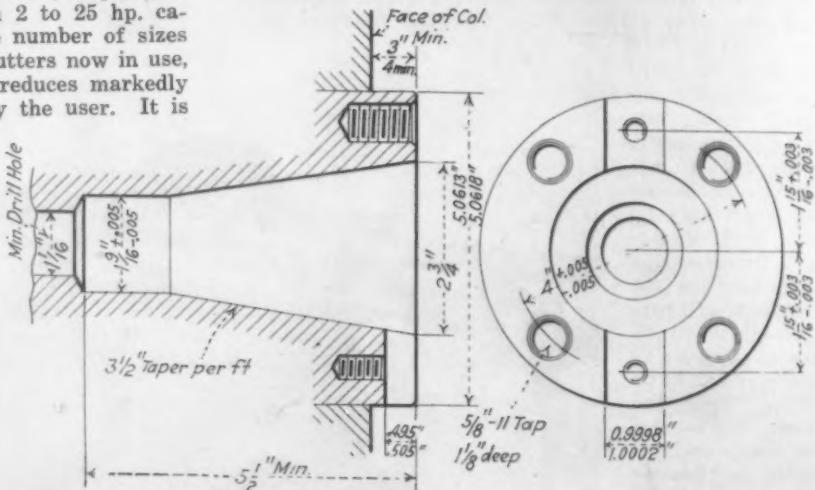


Fig. 1 (at left)—Longitudinal Section of New Spindle End

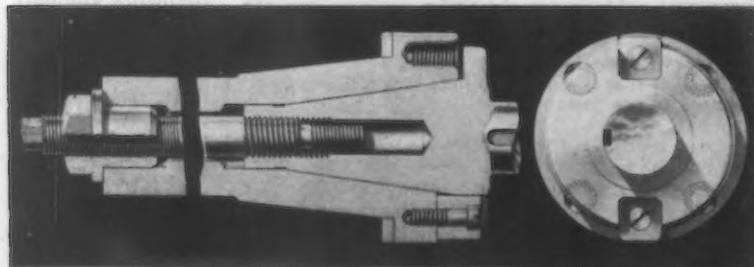
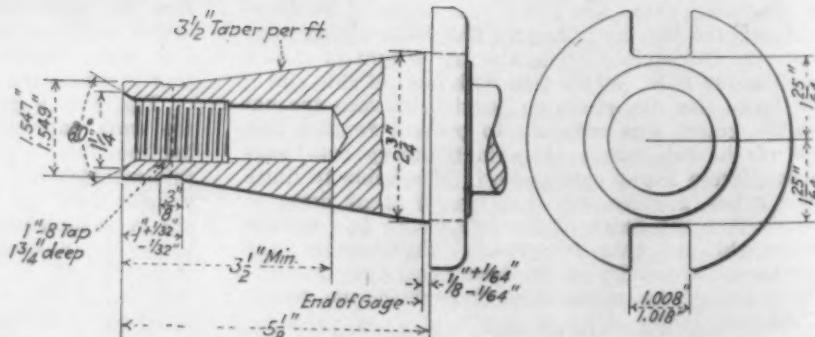


Fig. 2 (above)—Essential Spindle Nose Dimensions



the general activities of the machine tool builders' association. The simplification activities of other branches of industry through the medium of the Department of Commerce have also had an influence. It is to be noted that all threads, nuts, wrench openings and other details are in accordance with existing recognized standards.

In undertaking this task, the milling machine group of the association met the situation in an unusual but very practical manner. Instead of attempting to decide on the best of the many designs in use and adopting that as a standard, a procedure which undoubtedly would have met with slight success because of the controversial nature of the problem, a committee of

Conn., Kearney & Trecker Corporation, Milwaukee; Kampsmit Mfg. Co., Milwaukee; R. K. Le-Blond Machine Tool Co., Cincinnati; Oesterlein Machine Co., Cincinnati; Reed-Prentice Corporation, Worcester; and the Sundstrand Machine Tool Co., Rockford, Ill. Prominent on the committee undertaking the details of this simplification work were J. B. Armitage, chief mechanical engineer of the Kearney & Trecker Corporation, and chairman of the committee; B. P. Graves, milling machine engineer of the Brown & Sharpe Mfg. Co.; and L. F. Nenninger, chief draftsman of the Cincinnati Milling Machine Co.

## Need for Such Standardization Long Recognized

Need for standardization, such as has been carried out by this group, has long been recognized. It was stressed in 1904 by the late William Lodge of the Lodge & Shipley Machine Tool Co., Cincinnati, in an address at the annual convention of the National Machine Tool Builders' Association. Since that time serious attempts have been made to carry out his recommendation, but until now they have been unsuccessful, due largely perhaps to the fact that spindle ends have

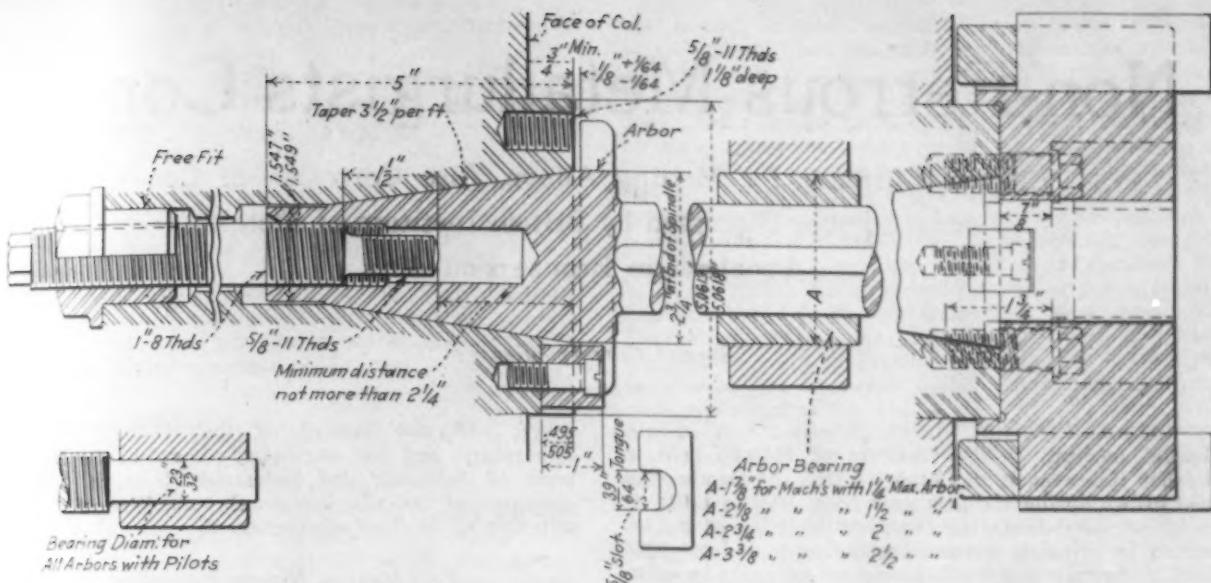


Fig. 4—Sketch Showing Design of Draw-in Bolt, Arbor Bearings and Other Details of Standardized Spindle End

engineers was appointed to pool their experiences and ideas and cooperatively produce the best possible design for use as a standard.

A survey of the industry revealed the sticking taper as the one undesirable feature common to all the present types of spindle ends.

#### Spindle End and Arbor Has Steep Taper

The standard spindle end and arbor, as developed by the committee, has a taper of  $3\frac{1}{2}$  in. per ft., a taper that experience has shown will not freeze or stick. The taper serves only the purposes of accurately centering the arbor and providing an area of intimate contact between the arbor and spindle. The arbor is driven by tongues on the face of the spindle and a draw-in bolt of large diameter holds the arbor firmly in place. The draw-in bolt is of new design and can be tightened without subjecting it to torsional strains.

Several machines equipped with this new style spindle and arbor, dimensional details of which are shown in Figs. 2, 3 and 4, were given extensive tests in different shops over a period of more than two years. This research has included extreme tests with steep angle spiral mills set to tend to free the arbor in the spindle hole. As high as 35 hp. has been transmitted and the results of all tests have proved highly satisfactory.

In addition to those mentioned above, some of the advantages of the new standardized spindle end to the user, as enumerated in the announcement, are as follows:

Inner end of spindle hole is bored straight for the arbor pilot, thereby keeping the arbor in place while inserting or removing the draw-in arbor bolt.

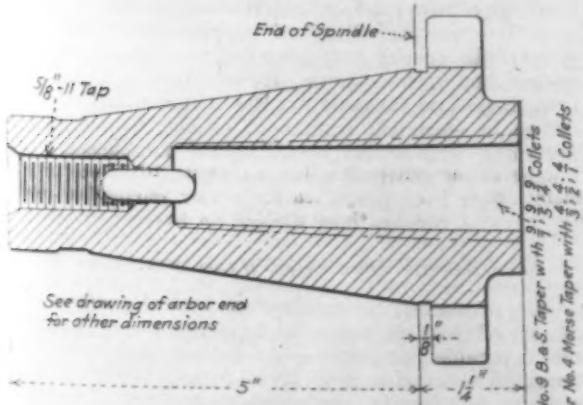


Fig. 5—One Type of Adapter Fits Into Taper Hole of the Spindle and Is Held In With the Draw-in Bolt

The steep taper with its large diameter bore at the outer end of spindle allows the use of stronger arbors, particularly where cutters must be extended.

Large diameter draw-in arbor bolt can be tightened under heavy pressure to hold the arbor firmly in the taper.

Front end of arbor draw-in bolt is provided with an extension threaded end for holding auxiliary equipment.

#### Arbors Standardized as to Length, Diameter and Other Details

A complete set of arbors has been adopted, standardized as to length, diameter and keyway and bearing size. This new series of arbors can be used on any size milling machine from 2 to 25 hp. Tools bought for a No. 1 machine can be used on a No. 5 machine and to facilitate ordering, a new system of numbering or nomenclature has also been adopted.

Three styles of arbors, designated as Style A, teated arbors; Style B, plain arbors, and Style C, shell end mill arbors, have been developed.

In the style A arbors, the standard teat or pilot is 23/32 (0.7180-0.7185) in. in diameter and 1 1/2 in. long. The five sizes standardized are of the following di-

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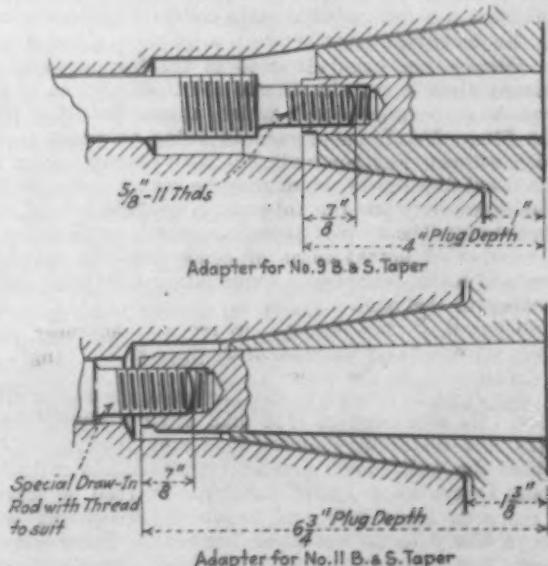


Fig. 6—Adapters for Arbors, End Mills and Other Tools Having a Threaded Hole for the Draw-in Bolt

# Non-Ferrous Metallurgists Confer

Electric Furnaces for Melting Alloys, Also Corrosion of Condenser Tubes Discussed by British Institute of Metals  
—Problems in Bronze Founding

(Special Correspondence)

LONDON, ENGLAND, March 10.—At the nineteenth annual meeting of the Institute of Metals, held in London this week it was reported that the membership had grown during the past year from 1692 to 1801. It is hoped to celebrate the twentieth birthday of the institute by bringing the membership up to at least 2000 and, if the rate of growth during recent years is maintained, this hope should be amply fulfilled.

The institute has been well served by some of the most distinguished metallurgists in Great Britain, but it owes a great deal to its able and courteous secretary, G. Shaw Scott, who has occupied the post since the formation of the institute with only 200 members and has given it quite an international character. Nearly every important country is well represented in the membership roll, and the number of members who are residents of the United States exceeds 200—more than 10 per cent of the total. W. M. Corse, consulting metallurgist, Washington, D. C., is a corresponding member to the council.

## Work on Corrosion of Condenser Tubes

One of the most important researches upon which the institute has been engaged is concerned with the corrosion and protection of condenser tubes. The greater part of the work carried out during the year has been on the formation of protective films and scales, since it is becoming more clearly recognized that the good behavior of brass tubes, under working conditions, frequently depends to an important extent on the presence of such films.

Special attention has been given to the influence of iron compounds on film formation, as the presence of iron appears to be an important feature in the more important types of films which are formed naturally. Attempts to produce such films artificially have shown that their formation is more complicated than appeared at first sight, and that the presence of other substances may have a profound effect. If other conditions are suitable, the presence in the liquid of as little as one part per million of certain colloidal materials may be the deciding factor between a good or a bad film.

Success has been obtained in the formation of resistant films in certain silicate solutions. Films of this type have been produced which appear to differ from the films already mentioned in being resistant to deposit attack. Further work has been carried out on the electrical differences which may be set up under certain conditions between the tubes and the tube plates of a condenser. The results provide a simple explanation of a number of actual cases of condenser-tube corrosion for which no satisfactory explanation has been forthcoming in the past.

## The New President

Sir John Dewrance is the president for the ensuing year. He was born in 1858 and, after studying chemistry and metallurgy under Professor Huntington, he joined the well-known firm of engineers and metallurgists, Dewrance & Co. of London. In 1880 he started a research laboratory and began experimenting with alloys likely to be useful in business. These experiments have been continued ever since. Among the numerous learned societies of which he is a member are the Institute of Mechanical Engineers (past president) the Iron & Steel Institute, Institution of Civil Engi-

neers; executive council of the National Physical Laboratory, and also engineering board of the Department of Scientific and Industrial Research. He is chairman of the alloys research committee of the Institution of Mechanical Engineers.

## Problems in Bronze Founding

In his presidential address, Sir John Dewrance referred particularly to bronze-founding and enumerated some of the problems awaiting solution. He said it would help the founder very much if copper refiners could be taught to supply gas-free copper. The refiner now puts oxygen into his otherwise refined copper to prevent the discharge of occluded gas destroying the appearance of the ingots.

Oxygen in copper is to the bronze-founder one of the worst impurities. When the tin is added to the copper it begins at once to take the oxygen from the copper, forming stannous oxide. The process extends beyond the time that the metal is kept molten. Stannous oxide is very viscous and surrounds bubbles of any kind, or slag, leaving a flaw in the casting. Remedies for these troubles, to be useful, must not add too much to the expense and must not unduly prolong melting.

Designers should make every effort to have all castings as uniform in thickness as possible. When there has to be a part of extra thickness, chills in the mold may provide a remedy. In theory a pyrometric reading should be taken before each cast, but this is not practicable. If the crucible is moved gently backward and forward, very accurate determinations of temperature can be made. When very hot, the metal washes against the side of the crucible like water, but when cool enough to pour it behaves more like cream.

If this is carried out before a molder with a pyrometer, it enables him to judge heats with great accuracy. When the metal is poured into the mold at the proper temperature the runner or gate sinks, but if poured too hot it rises, and the castings in such cases are useless. No such mold should be trimmed, but should be broken and shown to the molder.

## Melting Alloys in Electric Furnaces

Donald F. Campbell, Campbell & Gifford, consulting engineers, London, presented a paper dealing in a practical way with the principal electric furnaces now used for melting alloys of copper, nickel, zinc, and silver with special reference to induction furnaces of normal and high capacity. He said that numerous failures in electric furnaces are due to metallurgists interfering in electrical equipment or electrical engineers designing impractical metallurgical appliances. For almost every group of alloys an electric furnace of special design is required, and for any particular metal, the type of furnace may depend on hours of work.

## Results from Ajax-Wyatt Furnaces

He presented tables showing typical performances of Ajax-Wyatt furnaces in Birmingham, working under favorable conditions. An actual day's run of 11 hours 15 minutes in a 75 k.v.a. furnace on 61:39 brass consumed 712 units, producing an average of 10.92 lb. of metal per unit with a consumption of 206 units per ton.

The average cost of melting 1 ton of 60:40 brass for

extrusion billets in a 600-lb. Ajax-Wyatt furnace is as follows:

	s.	d.
Power 224 kWhr. @ 0.75d.	14	0
Lining and repairs	1	6
Labor, 1 man at £2, making 12 tons per week, per shift	8	4
	<hr/>	<hr/>
	23	10

From this sum should be deducted about 10 shillings, representing the saving by reduction in furnace metal losses when comparing with other melting furnaces.

Pit fire costs at different works at Birmingham vary considerably, but the following are, it is believed, a fair average cost per ton in works manufacturing 60:40 brass under economic conditions:

	s.	d.
Coke	8	0
Crucibles	4	6
Repairs	1	0
Labor	22	6
	<hr/>	<hr/>
	36	0

There is in all cases a saving of at least 1 per cent in the loss of zinc, though methods of calculating losses are varied and, with spelter at £35 per ton, this saving is equal to 7s. per ton of brass. If the savings, due

that in coke furnaces, because they are cooled and supported by powdered insulating material on the outside. The first heat can be poured within 75 min. of commencing work, and the absence of coke, ashes, furnace gases, and other incidental troubles, makes this system of melting most advantageous for all nickel alloys.

Another interesting installation of small units was erected in Staffordshire to manufacture nickel-iron alloys of exceptional purity to be used for "loading" submarine cables. In this case, high-frequency current was produced by mercury spark gaps operated in hydrogen with batteries of condensers for power factor improvement. Forty-two such units were used and have been operated for many months, both day and night shifts, with satisfactory results. For submarine cable work the maximum carbon allowed is 0.02 per cent, and metal to this specification was regularly produced under factory conditions. These small units are also used by all the leading platinum refiners, and can melt 5 to 6 lb. of this metal in about 15 min.

It is interesting to compare the effect of stand-by losses on an Ajax-Wyatt furnace with the conditions when operating an Ajax-Northrup furnace, which has no stand-by loss during idle hours, but has a lower over-all efficiency for the conversion of energy from the electric supply mains to useful heat units. In the latter case high-frequency energy is generated by a motor generator which has an efficiency of only about 72 per cent; the additional loss in the furnace itself reducing the over-all efficiency to about 60 per cent against 83 per cent for the Ajax-Wyatt furnace. If the two furnaces be worked 8 to 10 hr. per day for 5½ days a week, it will be found that the high-frequency Northrup furnace is about equal in efficiency and possesses several marked advantages for numerous difficult metallurgical operations.

The capital expenditure per kilowatt installed is approximately the same for the two furnaces, and the operating cost of the Wyatt furnace is lower for continuous operations.

#### Discussion

During the discussion on Mr. Campbell's paper, several speakers urged the necessity for closer collaboration between the metallurgist and the engineer in regard to electric furnaces and pointed out that, even in the United States and in Germany, there was insufficient collaboration, for the mechanical arrangement of furnaces leaves much to be desired. Dr. W. R. Barclay, Mond Nickel Co. Ltd., expressed his disappointment that the arc furnace has received comparatively little attention. Troubles with refractories are not experienced in arc furnaces which afford much greater scope for choice of refractories. Moreover, the arc furnace, if properly controlled, gives a high degree of purity.



**SIR JOHN DEWRANCE** is the new president of the Institute of Metals. He is the head of Dewrance & Co., engineers and metallurgists, London, England.

to no expense or space being required for storage of coke and handling of ashes, and the improvement of working conditions and ease of handling be added, a reduction in working costs of at least £1 per ton is obtained, which provides the necessary funds for the amortization of the capital expenditure for the furnace in one to two years.

#### Alloys from Ajax-Northrup Furnaces

Recent results on a large number of consecutive heats of different alloys made in Ajax-Northrup furnaces holding about 600 lb. are as follows:

Six-cwt. charges of nickel-silver, containing about 15 per cent of nickel, were melted in an average time of one hour, the average production being 6.7 lb. per kWhr., or just under 350 units per ton.

Four-cwt. charges of cupro-nickel were melted in an average time of 55 min., the average production being 5 lb. per kWhr., or 448 units per ton.

The wear on crucibles is normally about 0.75 in. deep after 60 heats of nickel-silver. Results obtained in the United States when melting silver showed an output of 10.9 per kWhr.

#### High-Frequency Melting

High-frequency melting is technically applicable, says the author, to almost any metal-melting work, though its use is limited at present to cases where economic conditions are favorable. Two such cases may be mentioned. In one works 12 furnaces, each of 600-lb. capacity, have been in regular use for a considerable time, melting copper scrap and nickel alloys. Two batteries, each of six furnaces, are in this case supplied with 100 kw. each from two 600-kw. machines generating 480 cycle current at 900 volts. The product of these furnaces is remarkable for its homogeneity, and the wear of crucibles is only a fraction of

#### To Discuss Quality of Foundry Pig Iron

Of outstanding interest, at the June meeting of the American Foundrymen's Association to be held at Chicago the week of June 6, will be the conference of pig iron producers and users to discuss the causes of variation in pig iron quality. Many reasons have been advanced in recent years to account for poor quality of some pig irons which, according to their chemical analysis, should give good results. The use of borings, turnings and other scrap has been cited as a probable cause. Another reason advanced is the forcing of the furnaces to get large output.

At the conference an endeavor will be made to bring out any definite information available. Ralph H. Sweetser, assistant to vice-president, American Rolling Mill Co., Columbus, Ohio, has accepted the chairmanship of the conference. Mr. Sweetser presided at a similar conference, conducted by the American Institute of Mining and Metallurgical Engineers at its February meeting in New York.

Selection of Chattanooga as the convention city for 1927 and a banquet at the Atlanta-Biltmore Hotel featured the meeting of the board of directors of the National Association of Manufacturers at Atlanta, March 22.

# Exports and Imports Both Fall

Incoming Iron and Steel Lowest in 27 Months—Pig Iron 4417 Tons in February Against 59,122 Tons Last Year

WASHINGTON, March 26.—Aggregating 166,129 gross tons, exports of iron and steel products in February were the lowest for any month since June, 1926, when the total was 159,506 tons. They reflected a slump of 49,106 tons under January, when exports were 215,235 tons. February imports, 49,460 tons, also showed a sharp drop of 13,992 tons under January, when the total was 63,452 tons. They were the lowest for any month since November, 1924, when the total

was 35,707 tons. Pig iron imports in February amounted to only 4417 tons, the lowest monthly incoming movement of foreign pig iron since December, 1921, when the total was 3975 tons, though in May, 1922, it was only 4476 tons. The February shipments of iron and steel, both outgoing and incoming, have shown such a downward turn as to be puzzling.

Export decline under January (aside from being in a month 3 days shorter), is attributed partly to the fact that the United Kingdom has regained some of the markets lost during the coal strike. Also, Great Britain is supplying her own markets in greater proportions, relying less on imports, especially in finished

## Sources of American Imports of Iron Ore (In Gross Tons)

	February		Eight Months Ended February	
	1927	1926	1927	1926
Canada	433	380	12,963	5,352
Cuba	54,000	46,700	376,500	345,312
Chile	101,900	81,900	883,600	321,900
Spain		4,700	13,393	68,377
Sweden	7,008		68,665	105,744
French Africa	26,850	6,000	209,289	84,675
Other countries	2,658	20,492	231,475	58,920
Total	192,904	160,172	1,801,885	1,490,280

## United States Imports of Pig Iron, by Countries of Shipment (In Gross Tons)

	February		January	
	1927	1926	1927	1926
United Kingdom	15,826		15,823	
British India	1,565	9,900	246	9,329
Germany	634	16,869	5,272	8,395
Netherlands		6,670	3,700	7,173
Canada	248	593		540
France		7,691		4,663
Belgium	1,230			930
Norway	1,945			
All others	25	253	108	1,560
Total	4,417	59,122	9,326	48,423

## Imports of Iron and Steel Products Into the United States, by Countries of Origin (In Gross Ton)

From	February		February		January	
	1927	1926	1927	1926	1927	1926
Austria			18		114	48
Belgium			15,321		9,582	19,692
Czechoslovakia			405		47	60
France			8,654		14,152	11,327
Germany			9,631		19,172	17,347
Italy			51			22
Netherlands			360		9,400	4,521
Norway			3,520		492	6
Sweden			1,466		2,189	1,284
United Kingdom			4,512		20,186	2,867
Other Europe					34	
Europe			43,948		75,768	57,174
Canada			3,859		4,465	5,471
Mexico			73		51	
Panama					6,494	19
Cuba					3,581	
British India			1,565		9,990	771
Japan			10		5	1
All others			5		259	16
Total			49,460		100,273	63,452

## Exports of Iron and Steel From the United States (In Gross Tons)

	February		January		Eight Months Ended February		Calendar Year Through February	
	1927	1926	1927	1926	1927	1926	1927	1926
Pig iron	2,427	1,478	3,734	22,253	24,612	6,161	3,141	
Ferromanganese	39	132	55	507	1,578	94	162	
Scrap	7,693	6,770	3,735	53,860	52,643	11,428	13,167	
Pig iron, ferroalloys and scrap	10,159	8,380	7,524	76,620	78,833	17,683	16,470	
Ingots, blooms, billets, sheet bar, skelp	2,552	4,099	3,212	77,545	63,503	5,764	7,307	
Wire rods	1,283	1,516	2,319	13,606	10,957	3,702	2,656	
Semi-finished steel	3,935	5,615	5,531	91,151	74,460	9,466	10,003	
Steel bars	10,052	11,115	12,337	92,093	78,363	22,339	22,185	
Alloy steel bars	372	243	490	3,233	2,093	862	706	
Iron bars	354	301	422	3,809	2,325	786	495	
Plates, iron and steel	8,850	10,277	10,470	89,326	70,002	19,320	19,379	
Sheets, galvanized	11,457	12,827	19,474	121,224	100,791	30,931	29,235	
Sheets, black steel	17,708	16,598	15,506	122,138	88,157	33,214	30,236	
Sheets, black iron	2,450	2,625	1,570	12,385	12,911	4,020	4,334	
Hoops, bands, strip steel	4,113	3,422	4,037	29,263	29,237	8,150	8,055	
Tin plate; terne plate	28,776	13,735	41,874	223,086	118,484	70,650	34,878	
Structural shapes, plain material	7,122	9,283	9,048	97,372	80,404	16,170	19,322	
Structural material, fabricated	4,739	7,834	4,985	43,931	58,175	9,724	17,112	
Steel rails	19,123	13,121	23,387	159,079	98,412	42,510	22,312	
Rail fastenings, switches, frogs, etc.	2,115	5,279	3,164	26,877	27,969	5,279	9,275	
Boiler tubes, welded pipe and fittings	21,495	18,423	42,300	221,268	181,439	63,795	51,322	
Plain wire	2,239	3,966	2,271	16,379	23,018	4,512	6,557	
Barbed wire and woven wire fencing	2,186	4,951	2,222	24,308	44,325	4,408	10,393	
Wire cloth and screening	143	207	239	1,358	1,371	382	331	
Wire rope	329	375	472	2,972	2,884	813	833	
Wire nails	404	918	770	6,729	7,530	1,174	1,850	
Other nails and tacks	557	670	647	4,329	6,013	1,314	1,315	
Horseshoes	15	106	37	385	526	52	154	
Bolts, nuts, rivets and washers, except track	846	1,260	1,002	7,997	10,804	1,848	2,264	
Rolled and finished steel	145,455	137,546	196,734	1,309,541	1,015,233	342,303	292,669	
Cast iron pipe and fittings	3,312	1,840	1,773	20,197	21,786	5,085	4,301	
Car wheels and axles	681	1,318	1,115	9,908	12,069	1,796	3,437	
Iron castings	1,013	460	770	6,143	7,008	1,783	1,159	
Steel castings	261	729	421	3,588	2,587	682	1,086	
Forgings	468	274	211	1,814	1,431	679	422	
Castings and forgings	5,735	4,621	4,290	41,650	44,881	10,025	10,405	
All other	845	1,025	1,156	8,694	8,639	1,886	2,234	
Total	166,129	157,187	215,235	1,527,656	1,252,046	381,363	331,772	

lines. United States exports to the United Kingdom in January amounted to 10,358 tons, while in February they declined to 5,185 tons. American total exports in February of the present year, however, were greater than for the corresponding month of 1926, at 157,187 tons. Likewise they were greater for the eight months ended February, 1927, than for the eight months ended February, 1926, the respective shipments being 1,527,656 tons and 1,252,046 tons.

It is a matter of interest and possibly of significance that, since the European Steel Trust was organized, Sept. 30, 1926, the trend of American exports has been upward while the shipments from Europe to the United States have been declining. In the case of the export movement there have been breaks in the curve in October and February only, when compared with the September movement. In the case of imports the decline has been unbroken each month since August.

This may be due partly to anti-dumping decisions and other activities of the Treasury Department, but it is held to be due chiefly to rising prices of foreign iron and steel products, which have come up more nearly to the American level. The increase in the duty

on pig iron declared by the president could have been no factor in the decline in the incoming movement of pig iron in February, inasmuch as the duty became effective 30 days after the date of the proclamation, Feb. 23. The anti-dumping order against imports from Germany, however, appears to have been one reason for the drop in pig iron imports from that country, which totaled only 634 tons in February. Norway was the principal source of pig iron imports for that month, supplying 1,945 tons. The striking contrast between imports of pig iron in February of the current year with that of February, 1926, is disclosed when it is recalled that for that month they aggregated 59,122 tons, against 4417 tons in February, 1927.

In connection with exports, it is observed that in some of the tonnages where our decline under January was most marked, sharp gains were made in the same products in exports from Great Britain, including boiler tubes and welded pipe, tin plate, plates, galvanized sheets and steel bars. Of the February exports, 51,725 tons went to Canada, while Japan took 32,156 tons; Cuba, 9,803 tons and China, 9,266 tons. Belgium was the leading source of imports in February, providing

#### Imports of Iron and Steel in Gross Tons

	Total Imports	Pig Iron	Ferro-alloys	Manganese	Ore and Oxide*
Calendar year 1922	714,224	383,445	109,084	374,451	
Calendar year 1923	734,599	367,820	100,120	206,048	
Calendar year 1924	556,814	209,109	59,910	255,157	
Calendar year 1925	943,240	441,425	80,269	265,688	
January, 1926	79,067	48,423	3,105	37,421	
February	100,273	59,122	5,194	27,239	
March	93,107	54,825	4,606	27,391	
April	107,636	54,359	6,949	59,666	
May	108,731	57,211	3,002	21,633	
June	124,215	43,106	5,277	31,815	
Fiscal year 1926	1,080,781	528,305	64,106	388,407	
July	82,411	32,206	1,702	34,133	
August	91,578	26,538	4,611	41,075	
September	85,484	17,508	2,525	18,167	
October	81,830	18,847	4,879	13,331	
November	81,259	17,560	6,057	20,091	
December	75,559	14,783	8,752	26,971	
Calendar year 1926	1,111,090	445,602	56,809	354,223	
January, 1927	63,452	9,326	2,517	50,605	
February	49,460	4,417	2,968	21,585	
Eight months	606,945	141,185	34,204	225,908	

\*Not included in "total imports." These figures are for manganese contents of the ore.

#### Exports of Iron and Steel in Gross Tons

	All Iron and Steel	Semi-Finished Material
*Average, 1912 to 1914	2,406,218	221,582 145,720
*Average, 1915 to 1918	5,295,333	438,462 1,468,020
*Average, 1919 to 1923	3,078,724	123,837 149,218
Calendar year 1924	1,805,073	41,478 114,417
Calendar year 1925	1,762,571	32,674 108,681
January, 1926	174,585	1,663 4,388
February	157,187	1,478 5,615
March	169,438	1,489 6,056
April	194,449	2,010 7,167
May	173,418	1,107 9,880
June	159,506	1,369 5,714
Fiscal year 1926	1,948,860	30,587 103,271
July	194,717	2,595 14,558
August	171,588	2,744 14,437
September	182,071	2,173 12,569
October	172,070	2,205 13,982
November	219,830	3,724 17,528
December	198,189	2,651 10,412
Calendar year 1926	2,167,448	25,208 120,602
January, 1927	215,225	3,734 5,531
February	166,129	2,466 3,935
Eight months	1,327,656	22,293 91,151

\*Calendar years.

#### Imports of Iron and Steel Into the United States

(In Gross Tons)

	February		January		Eight Months Ended February		Calendar Year Through February	
	1927	1926	1927	1926	1927	1926	1927	1926
Pig iron	4,417	59,122	9,326	141,185	318,804		13,743	107,545
Perromanganese*			2,056	4,934	1,201	23,950	3,257	7,565
Ferrosilicon			912	260	957	9,702	1,869	684
Ferrochrome					359	552	359	
Scrap			4,686	12,177	5,920	65,405	64,685	10,606
Pig iron, ferroalloys and scrap	12,071	76,493	17,763	210,794	427,561		29,834	180,872
Steel ingots, blooms, billets and slabs	1,540	3,184	944	14,261	14,446		2,484	5,123
Iron blooms, slabs, etc.				306	779			
Wire rods	929	912	1,512	7,826	5,668		2,441	2,085
Semi-finished steel	2,489	4,096	2,456	22,193	20,893		4,925	7,208
Rails and splice bars	1,110	1,038	2,744	30,137	16,135		3,854	2,473
Structural shapes	10,294	5,246	11,363	94,935	45,258		21,657	10,239
Boiler and other plates	222	180	452	2,543	1,153		674	451
Sheets and saw plates	1,100	346	1,646	10,104	2,622		2,746	1,055
Steel bars	5,428	4,472	6,560	61,029	41,697		11,988	11,201
Bar iron	233	904	632	3,347	4,854		865	968
Hoops, bands and cotton ties	2,784	957	2,946	23,253	6,694		5,730	1,878
Tubular products (wrought)	3,061	1,237	5,146	27,755	22,503		8,207	3,478
Nails, tacks, staples	521	204	526	4,485	2,509		1,047	226
Tin plate	19	23	23	260	281		42	25
Bolts, nuts, rivets and washers	38	64	21	180	119		59	65
Round iron and steel wire	405	352	185	2,941	2,775		590	639
Barbed wire	839	525	459	2,206	5,278		1,298	1,445
Flat wire: strip steel	65	241	344	2,342	1,569		409	457
Steel telegraph and telephone wire	1	..	23	1,070	132		24	..
Wire rope and strand	202	108	117	1,625	843		319	160
Other wire	18	175	21	476	744		39	337
Wire cloth and screening	9	14	48	281	246		37	26
Rolled and finished steel	26,349	16,076	33,256	268,949	156,412		59,605	35,228
Cast iron pipe	8,376	3,444	9,534	72,982	40,410		17,910	5,449
Castings and forgings	195	164	443	2,007	1,815		638	528
Total	49,460	100,272	63,452	606,945	647,092		112,912	179,280
Manganese ore*	21,585	27,739	50,605	225,908	248,402		72,190	65,237
Iron ore	192,904	160,172	225,480	1,793,841	1,490,280		488,384	362,504
Magnesite (dead burned)	6,916	10,905	..	27,375	40,894		6,916	24,241

\*Manganese content only, except shipments of ore from Cuba, which are stated in gross weight. In February, 1927, these shipments from Cuba amounted to 2298 tons.

15,321 tons. Germany was second with 9631 tons and France third with 8654 tons.

Tin plate constituted the largest item of exportation in February, the total being 28,776 tons, Japan being the heaviest buyer, taking 5016 tons. Of the 5554 tons of black welded pipe exported in February, Japan took 1155 tons; the United Kingdom, 953 tons; Colombia, 764 tons; Canada, 450 tons; Mexico, 400 tons and Cuba, 347 tons. Of the 2969 tons of galvanized pipe exported that month, Japan took 659 tons; Cuba, 520 tons; Brazil, 477 tons and the United Kingdom, 299 tons. Casing and oil line pipe exports in February totaled 11,204 tons, the principal countries of distribution being Venezuela, 4412 tons; Colombia, 2235 tons; Mexico, 1057 tons and Java and Madura, 644 tons.

Steel bar imports in February, amounting to 5428

tons, came principally from the following sources: Belgium, 2114 tons; Germany, 1877 tons; Sweden, 565 tons and the United Kingdom, 438 tons. Hoops, bands, and cotton ties amounting to 2784 tons were imported in February, of which 1491 tons came from Belgium and 1030 tons from Germany. Structural shape imports totaled 10,294 tons, of which 8438 tons came from Belgium, 1372 tons from Germany and 357 tons from France. Of the 8376 tons of cast iron pipe imported in February, 6153 tons was credited to France and 2222 tons to Belgium. Canada provided 904 tons of the 2056 tons of ferromanganese imported in February. Of the 21,585 tons of manganese concentrates imported in February, 9423 tons came from Brazil; 6194 tons from British India and 2330 tons from British West Africa.

## Lake Ore Iron Content Holds Up Well

1926 Average Slightly Above That of Past 10 Years, at 51.75  
Per Cent—Low-Phosphorus Shipments Heavy

LAKE SUPERIOR ore shipped during 1926 held up in iron content with that produced during several previous years and was slightly above the average for a ten-year period. This is shown in the annual report of the Lake Superior Iron Ore Association, Cleveland, that gives in tabulated form average analyses for ten years of all grades of ore from all ranges, both individually and collectively. These tables show the tonnages produced by grades and ranges, the percentage of the iron content (natural), phosphorus, silica, manganese and moisture. The chart shows the average analyses of the total tonnage of all grades from 1902 to 1926.

Average content of iron natural for all grades last year was 51.75 per cent, compared with 51.74 per cent during the previous year, and with a high content for the ten-year period of 52.07 per cent during the lean tonnage year of 1921. Other elements have remained fairly uniform. The phosphorus content last year was 0.101 per cent, a slight increase over 1925, when it was 0.099 per cent. The amount of silica, 8.35 per cent, showed a reduction from the previous year's 8.42 per cent. Manganese content declined from 0.82 per cent to 0.80 per cent last year. The moisture content, which had dropped to 10.58 per cent in 1925, went back to 10.78 per cent last year. The decrease in moisture during the previous year was attributed to the large amount of ore washed during that year, and the increase last year is perhaps due to the fact that considerably less ore was washed in 1926 than in the previous year.

### Mining High-Grade Ore Keeps Iron Content Well Up

On their face the analyses are very satisfactory, in that they indicate that Lake Superior ores are holding up to their average iron content of the past 15 years. However, it is evidently true that the richness of the ore produced is being kept up by concentrating on the mining of high-grade ore and leaving more of the leaner ores in the ground. Lower prices in 1925 left little profit for the industry and many mines were

operated at a loss. That the mining companies made a better financial showing last year, with the same prices, was due in part to increased shipments.

However, the low prices, together with high taxes on ore in Minnesota, have caused mining companies to restrict their operations more to the mines having the richer ores, and from which there are better returns. Consequently some leases were canceled last year, the properties reverting to the fee owners, and quite a few other mines producing lean ores were not operated during

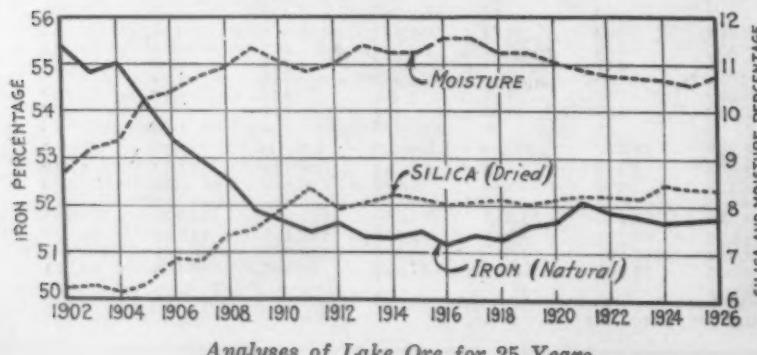
### Shipments of Ore by Grades

	1926		1925	
	Gross Tons	Per Cent	Gross Tons	Per Cent
All Ranges	15,041,032	25.4	14,916,817	27.2
Bessemer	36,192,728	61.2	31,917,753	58.3
Low-phosphorus non-Bessemer	4,424,939	7.5	4,532,815	8.3
High-phosphorus non-Bessemer	1,196,604	2.0	1,169,498	2.1
Silicious	2,296,065	3.9	2,247,172	4.1
Manganiferous				
Total	59,151,368	100.0	54,784,355	100.0

ing the year. This tendency to restrict production to mines producing the richer ores was possible because of the over-development of the Lake Superior industry. As a result, high-grade ores are being used up more rapidly than if more of the leaner ores were mined. This trend is doubtless a factor in keeping up the average iron content.

Average iron content of Bessemer ore last year was 55.16 per cent, the highest in ten years and compared with 54.80 per cent in the two previous years. The average of low-phosphorus non-Bessemer ore was 51.39 per cent iron, lower than the 51.46 per cent of 1925, but higher than in any other of the past ten years. The average iron content of high-phosphorus non-Bessemer ore was 51.11 per cent, the highest in ten years, against 50.85 per cent in 1925. On the other hand, the iron content of both silicious and manganiferous ores was less than in any previous season for ten years. Silicious ore showed 39.79 per cent iron as compared with 39.91 per cent in 1925, and manganiferous ore ran 42.64 per cent in iron as compared with 43.46 per cent during the previous season. Manganese in manganiferous ores averaged 6.83 per cent, compared with 6.57 per cent in 1925. Except for the 7 per cent of 1924, the 1926 figure was the highest in 10 years.

Low-phosphorus non-Bessemer ore shipped last year gained nearly 3 per cent in proportion and all other grades showed a loss in percentage of the total. Of the total 61.2 per cent was low-phosphorus non-Bessemer ore.



# European Domestic Business Better

More Syndicates in Prospect—Japanese Loan to Chinese Mill Postponed—German Dumping in Japan Found but No Action Will Be Taken

(By Cable)

LONDON, ENGLAND, March 28.

DURHAM coke prices are easier. German buyers have closed on 24,000 tons. Midland coke producers have increased second quarter prices 2s. per ton to 22s. (\$5.33), delivered.

Pig iron is still quiet as consumers expect further reductions, but makers are not inclined to concessions as connected steel works are absorbing most of the current output of furnaces. Hematite prices are weaker and domestic sales are increasing, but foreign business is still hampered by the high price. Foreign ore continues quiet.

Finished steel makers are operating at full capacity and are pressed for deliveries, particularly by shipyards, but new business is quiet although inquiry is broadening. Cochrane & Co., Ltd., Middlesbrough, has secured 7000 tons of cast iron pipe for Natal. Baldwins, Ltd., is closing its Landore steel works in Swan-

sea, Wales, indefinitely. The plant includes two blast furnaces, two 40-ton and four 35-ton open-hearth furnaces, a 3-high cogging billet and sheet bar mill and coke ovens.

Tin plate is easy as a result of the poor general demand. Restriction of output, however, becomes effective today and prices are expected to develop more stability. Meanwhile consumers are purchasing only enough to cover immediate requirements.

Galvanized sheets are steady with moderate sales of small lots. Japanese specification black sheets have been sold for May-June shipment and there are inquiries from other markets, but total sales are not important.

Continental markets are influenced by the cartel meetings and business is at present difficult to transact. Supplies of semi-finished steel are more easily obtainable and sheet bars have sold at £5 7s. 6d. (\$26.07) per ton, delivered to Welsh works. Foundry pig iron has sold at £3 9s. 6d. (\$16.85) per ton f.o.b.

## JAPANESE MILLS ASK AID

Nationalization Still Urged—Loan to Hankow Works Postponed by Chinese Movement

TOKIO, JAPAN, Feb. 28.—Although the Diet has definitely decided not to consider further increase in the tariff this year, agitation for greater protection will undoubtedly continue, as the iron and steel industry obviously needs assistance in some form. The elaborate system of subsidies instituted in April, 1926, appears to have been insufficient, despite the increased business that developed as a result of the British strike. Steel makers are still claiming that German, French and Luxemburg steel is being dumped in the Japanese market and are urging some legislation by which the steel business can be made to pay.

In addition to the higher tariff advocates, some steel makers are urging nationalization of the industry. The Government, however, is not particularly in-

terested in taking over the plants at the valuations of the owners. The Japan Steel Co. has passed its dividend for the last quarter of 1926, showing a net profit of only 56,237 yen, of which 3000 yen went to legal reserve, 3,000 yen to surplus and the remainder to officials and employees as bonuses. The Toyo Iron Co. passed both its half yearly dividends last year. The Japan Steel Tubing Co. was able to continue its 7 per cent dividend on the preferred stock.

Stocks of pig iron, which declined in the early months of last year began to increase in the second half of the year. According to statistics compiled by the Mitsubishi Shoji Kaisha there was a total of 168,011 tons of pig iron in the hands of producers, distributors and consumers at the end of October, 180,264 tons at the end of November and 197,224 tons at the end of December.

Following prolonged discussions, the Government decided to loan another 2,000,000 yen to the Hanyeh-ping Coal & Iron Co., near Hankow, China. The com-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd.	£1 4s.	to £1 2½s.	\$5.82
Bilbao Rubio ore†	1 2	to £1 2½s.	5.33 to \$5.45
Cleveland No. 1 fdy.	4 2½		20.00*
Cleveland No. 3 fdy.	4 0		19.40*
Cleveland No. 4 fdy.	3 19		19.15*
Cleveland No. 4 forge	3 18½		19.03*
Cleveland basic	3 15	to 3 15½	18.18 to 18.30
East Coast mixed	4 5	to 4 6	20.61 to 20.85
East Coast hematite	4 7½	to 4 8½	21.22 to 21.45
Rails, 60 lb. and up	7 15	to 8 5	37.58 to 40.01
Billets	7 5	to 7 10	35.16 to 36.37
Ferromanganese	16 0		77.60
(export)	16 0		77.60
Sheet and tin plate bars, Welsh	6 5	to 6 10	30.31 to 31.52
Tin plate, base box	0 19½	to 1 0	4.75 to 4.85
Black sheets, Japanese specifications	14 5		69.11
			C. per Lb.
Ship plates	7 15	to 8 5	1.68 to 1.78
Boiler plates	11 0	to 11 10	2.38 to 2.49
Tees	8 10	to 9 0	1.84 to 1.95
Channels	7 15	to 8 5	1.68 to 1.78
Beams	7 10	to 8 0	1.62 to 1.73
Round bars, % to 3 in.	8 5	to 8 15	1.78 to 1.89
Steel hoops	10 10	to 11 0	2.28 to 2.39
Black sheets, 24 gage	11 5		2.44
Galv. sheets, 24 gage	15 5	to 15 7½	3.30 to 3.33
Cold rolled steel strip, 20 gage, nom.	18 0		3.91

\*Export price, 6d. (12c.) per ton higher.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports (Per Metric Ton)				
Foundry pig iron : (a)				
Belgium	£3 9 ½ s.	to £3 10 s.	\$16.85	to \$16.97
France	3 9 ½	to 3 10	16.85	to 16.97
Luxemburg	3 9 ½	to 3 10	16.85	to 16.97
Basic pig iron:				
Belgium	3 5	to 3 15	15.76	to 18.18
France	3 5	to 3 15	15.76	to 18.18
Luxemburg	3 5	to 3 15	15.76	to 18.18
Coke	0 18		4.27	
Billets:				
Belgium	4 12	to 4 13	22.20	to 22.55
France	4 12	to 4 13	22.20	to 22.55
Merchant bars:			C. per Lb.	
Belgium	5 0	to 5 1	1.10	to 1.11
Luxemburg	5 0	to 5 1	1.10	to 1.11
France	5 0	to 5 1	1.10	to 1.11
Joists (beams):				
Belgium	5 0		1.10	
Luxemburg	5 0		1.10	
France	5 0		1.10	
Angles:				
Belgium	5 0		1.10	
1/4-in. plates:				
Belgium (nominal)	6 12		1.45	
Germany (nominal)	6 12		1.45	
1/2-in. ship plates:				
Belgium	6 2		1.34	
Luxemburg	6 2		1.34	
Sheets, heavy:				
Belgium	6 3	to 6 4	1.33	to 1.34
Germany	6 3	to 6 4	1.33	to 1.34

(a) Nominal.

pany already owes 43,000,000 yen to Japan, but its funds have been dissipated and as a result of the war in China it has been unable to fill its contracts for deliveries of pig iron and ore. As Japanese consumers need the raw materials available from the Hanyehping works, and in addition there was apparently no other means of collecting the outstanding loan, it was finally decided to lend the required 2,000,000 yen. Shortly after this decision, however, the Chinese nationalist government announced its plan to nationalize all the steel and iron works under its control. This included taking over the Hanyehping works and recognizing the debt of the company to Japan. There was strenuous objection to the loaning of money to the nationalist government, so the entire proposition has been delayed.

There has been considerable opposition to the proposal that the Government purchase the Kyushu Steel Co. The plant has a capacity of 70,000 tons a year and was completed in 1920 with the most modern American equipment. After operating for a few months it suffered so severely from the depression that followed soon after that it closed and has not been operated since. A tentative contract to purchase has been signed by the government, but approval by the Diet is doubtful, as there is opposition to the acquisition by the Government of a plant that the owners apparently can not operate profitably.

The Government Steel Works and private producers of steel bars have entered into an agreement, expected to become effective about May 1. Under its terms the Government works will have exclusive right to the manufacture of steel bars of more than 2 in. and flat and square bars of more than 2% in. Private plants will have exclusive right to the manufacture of steel bars of 5/8 in. to 1 in. All other sizes are open to both the Government works and private makers. In addition there is a schedule limiting the tonnage that may be produced by each plant.

The special commission appointed by the Government to investigate the charges that German steel is being dumped in Japan has reported that the charges are substantiated, recommending action. Following consideration of the report by the high officials of the Ministry of Commerce and Industry, it was decided that steel from France, Belgium and Luxemburg is entering Japan at prices as low as those of the German products and yet are not being dumped because of the depreciated exchange. It was pointed out further that although Germany has no commercial treaty with Japan, Belgium has, and that there would be no remedy against German steel being imported by Japanese consumers by way of Belgium. It was accordingly declared, that action against so-called dumping of German steel would be useless.

## AUSTRIAN MARKET DULL

### Polish Competition Serious—Export Agreement Sought—Higher Tariff Proposed

VIENNA, AUSTRIA, March 10.—General business is unsatisfactory. In February the total of unemployed reached 275,000, the largest since the foundation of the republic. The annual report of the national bank, however, declares that the prevailing pessimism is without foundation, particularly in so far as it is based upon the passive foreign trade balance, as it has been found to be inaccurate.

Thus far Austria has gained but little by adherence to the International Raw Steel Cartel. Polish competition is still a serious factor in foreign trade with other near-eastern markets and in the Austrian domestic field, which has considerably curtailed the expected gain to Austrian industry through the recent division of markets with Czechoslovakia.

Efforts to create domestic selling organizations continue. Locomotive builders have completed an agreement for the sharing of orders and a similar arrangement is being negotiated among the railroad car builders. Negotiations for the creation of a joint sales organization for the entire iron and steel industry have not yet been successful.

The position of the Alpine Montangesellschaft, the principal iron and steel producer of Austria, is not im-

proved. The domestic market is quiet and export business has declined. After entry of Poland into the International Raw Steel Cartel, it is hoped that the Polish mills will enter into an agreement for division of eastern markets with Austria, Czechoslovakia and Hungary.

The proposed amendment to the tariff, which is now under consideration by the National Council, is decidedly protectionist. The duties on automobiles and automotive products are materially increased. Under the proposed duties imports of automobiles will be subject to a specific duty per car, whereas the existing duties are on a mixed specific and ad valorem basis. Not only chassis, but separate body work is heavily protected. Duties are also imposed on light gage sheets, which are not at present produced in Austria and on pipes and tubes. Bicycles and parts also are subject to a higher duty than at present.

Production of iron and steel in Austria during 1926, marked a decline from 1925 in pig iron output but a slight increase in steel. Pig iron production totaled 332,863 metric tons, compared with 379,922 tons in 1925. Ingot output was 473,666 tons compared with 463,578 tons in 1925. Output of rolled products in 1926 was 335,593 tons and in 1925 352,066 tons. Of the rolling mill production in 1926, bars contributed 146,592 tons, sheets 40,960 tons and wire rods 59,761 tons. The total steel production was about half the 1913 output of 800,000 tons.

## GERMANY PROSPEROUS

### Business Active and Improvement in Export Expected—Unemployment Declines

BERLIN, GERMANY, March 12.—Business continues to improve and according to the quarterly report of the Institute for Trade Conditions, there has been a steady improvement in prosperity since November, 1926. Unemployment has steadily declined since the peak of about the middle of January and wages are advancing slowly with some labor difficulties reported.

Latest official returns on wages paid in 12 leading industries show an average compensation to skilled workers of 46.40 m. per week, about \$11, to unskilled workers 34.47 m. per week, about \$8.20. The average weekly wage of skilled workers in the metal industries is 45.7 m., slightly lower than the average for all other industries, with unskilled labor in the metal industries receiving 31.12 m. per week. The official re-

turn shows that only 10,000,000 working hours were lost through labor disputes in 1926, compared with 136,000,000 hours lost in 1925.

The international steel market shows distinct signs of improvement and a general revival of export business is expected. French and Belgian delivery terms are averaging 8 to 10 days longer than at the beginning of February and export prices are slightly higher than a month ago. This situation has led to an increase in the second quarter quota of the International Raw Steel Cartel.

Improved business in the domestic market continues, although pig iron demand from foundry consumers is still small. Buying of semi-finished material is better and most mills are so well booked with business that export inquiries are not interesting. The increase in demand for structural material, however, has not developed as had been expected but there is an active market on bars and bands and sheet purchasing is satisfactory. Domestic business in wire and wire products is light, but this is offset by a good volume of

export purchasing. Railroad permanent way business is good both from domestic and foreign sources.

February pig iron production totaled 966,909 metric tons compared with 1,059,798 tons in January, but only 631,374 tons in February, 1926. Daily output averaged

Product	World Market	Domestic
Ingots	80..... \$18.98	100..... \$23.73
Blooms	85..... 20.17	105..... 24.92
Billets	92.50..... 21.95	112.50..... 26.70
Slabs	95..... 22.55	117.50..... 27.88
Bars	100..... 23.73	134..... 31.80
Shapes	98..... 23.25	131..... 31.09
Bands	120..... 28.48	154..... 36.54
Sheets, heavy	125..... 29.66	148.90..... 35.33
Sheets, medium	135..... 32.04	155..... 36.78
Sheets, light	147.50..... 35.00	170..... 40.34

34,532 tons compared with 34,187 tons a day in January and 22,549 tons a day in February, 1926.

Price rebates or bounties paid by the steel syndicate on materials bought for manufacture into products for export were in most instances increased for March. These rebates were reduced in the latter part

of 1926, but as a result of a declining "world market" they have been steadily increased since then. The following table in marks per metric ton shows the German domestic quotations and the "world market" prices established for March. The difference between these prices is covered by the bounty.

The Association of Machinery Manufacturers reports a gradual improvement of business, particularly in the domestic market. In February, 40 per cent of the firms in the association reported unsatisfactory business, compared with 50 per cent in January.

Shipbuilding has received a new impulse from the Hamburg-American Line decision to contract for 14 vessels of a total tonnage in excess of 100,000 tons. This is in addition to the 8 new ships announced in December. The company is increasing its capital from 30,000,000 m. to 160,000,000 m.

The Reparations Commission has approved the Serbian contract with Germany for a bridge over the Danube from Belgrade to Pancevo, to cost 21,000,000 m., 16,500,000 m. to be booked to reparations account. The Siemens Bau-Union and nine German bridge material companies, including Friedrich Krupp & Co., are interested.

## BELGIAN PRICES ADVANCE

### Semi-Finished Market Strong—Prospect of More International Syndicates

ANTWERP, BELGIUM, March 12.—Conditions in the iron and steel market are much improved, although orders are still small. A number of mills, however, have been able to book a sufficient tonnage to maintain prices and in a few instances makers are virtually out of the market. Scarcity of semi-finished material, demand for which has been good, has had a tendency to strengthen finished products. German competition is no longer much of a factor, as German mills are well occupied with their own domestic business. This is also true to a great extent of French competition, which has receded as French domestic demand has increased. Buyers for export are beginning to admit the higher level of the market and are showing anxiety at the continued reports of further international cartels and syndicates, such as the proposed agreement among makers of beams and the suggested sales syndicate on semi-finished products.

**Pig Iron.**—Current demand is small and prices are stationary. However, stocks on furnace yards are small and as far as the domestic market is concerned there is no tendency toward lower prices. The price for domestic consumers of No. 3 phosphoric foundry continues at 140 fr. (Belgian), about \$19.45, but German furnaces are quoting about 5 fr. (70c.) per ton lower. Export prices are fairly firm with No. 3 foundry quoted at £3 10s. per ton (\$17.15), f.o.b. Antwerp. The syndicate price for half-washed furnace coke continues at 46 fr. (Belgian) \$6.39, but lower prices are reported in the open market, as low as 40 fr. (\$5.55) from German sellers.

**Semi-Finished Material.**—Although quotations have been advanced considerably in the past fortnight, the market continues firm and exhibits a further upward tendency. Most makers are well-booked with business and the larger mills are practically out of the market. Exporters are no longer insisting upon substantial concessions, in most instances being willing to place orders at the original quotation. Sales of 2-in. and 2½-in. billets have been made at £4 16s. per ton (\$23.50), 3-in. billets have sold at £4 13s. 6d. per ton (\$22.90) and 4-in. at £4 12s. 6d. (\$22.65), all f.o.b. Antwerp. Blooms are quiet with 4-in. quoted at £4 10s. (\$22) per ton, 6-in. and larger at £4 4s. to £4 5s. (\$20.37 to \$20.60), f.o.b. Antwerp.

**Finished Material.**—The market is firm and shows a well defined upward tendency. Although demand is limited, makers are well-booked with tonnage accumulated in the past few weeks and several of the larger mills are temporarily out of the market. The former quotation of £5 per ton (\$24.25), f.o.b. Antwerp on

bars is obtainable today only on large and desirable business. The current market is more nearly £5 1s. to £5 2s. per ton (\$24.50 to \$24.73), f.o.b. Antwerp. The market on beams is being maintained partly as a result of the firm semi-finished prices. Prices range from £5 per ton (\$24.25) on large business and normal specifications to several shillings per ton higher.

## PIG IRON CARTEL POSSIBLE

### Germany Willing—France and Belgium Oppose Quotas by Products in Steel Cartel

BERLIN, GERMANY, March 12.—Representatives of pig iron producers in Germany, France, Belgium and Luxembourg, met in Dusseldorf, March 4, to discuss the formation of an International Pig Iron Cartel. At present there is in Germany the Pig Iron Syndicate and France, Belgium and Luxembourg have a pig iron "entente," a loose price control and sales organization. German producers of pig iron have expressed willingness to join an international cartel provided national quotas are fixed on a basis similar to the method of the International Raw Steel Cartel. The British attitude toward such an association of pig iron producers is not definitely known, but an effort will be made to include Great Britain.

Germany will not withdraw from the International Raw Steel Cartel and according to latest reports no increase in the German quota will be demanded. The complaint of the German members of the cartel is that the organization has not succeeded in its original purpose of maintaining international prices at a profitable level by regulation of production. They insist that rigid selling syndicates within the cartel and control of each product by quotas are necessary.

This plan is meeting with considerable opposition in Belgium and Luxembourg and particularly among French members. It is claimed that the fixing of national export quotas through sales syndicates would meet with difficulties. Conditions in the different countries vary greatly. In Germany, at present, domestic business is much more important than export, constituting from 75 to 80 per cent of production, while in France current domestic business composes only about 50 per cent of production and the percentage is even lower in Belgium and Luxembourg.

Negotiations for an International Wire Cartel will be resumed in Berlin late this month and a satisfactory settlement is expected. Participants include mills in Germany, Belgium, Holland, Czechoslovakia and manufacturers in Austria, Hungary and Poland are expected to join later. The Essen Wire Cables Syndicate has initiated negotiations for the formation of an international syndicate of wire cable manufacturers.

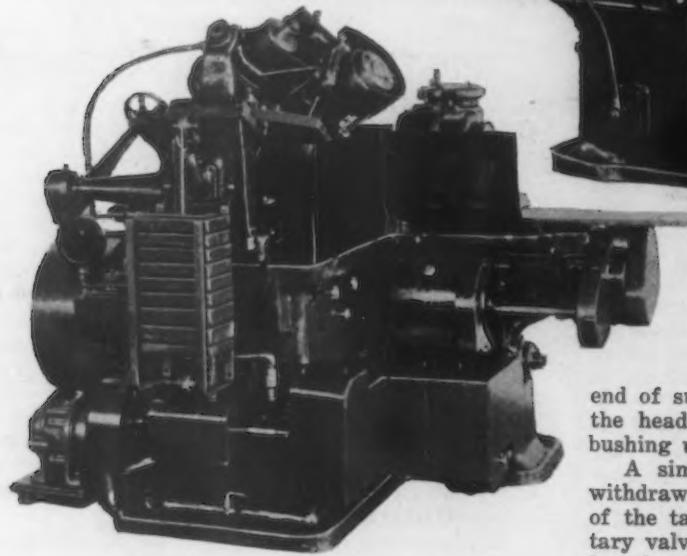
## WORM THREAD GRINDER

### Automatic Machine for Either Soft or Hardened Pieces Up to 8 In. in Diameter

A SPECIAL universal machine for grinding worm threads, and intended for use in grinding either soft or hardened pieces, has been brought out by the Brown & Sharpe Mfg. Co., Providence.

The machine has been employed for grinding worms for a variety of applications, including machine tools, automotive truck drives, turbines, elevators and domestic oil burners. It will grind worms with threads of all sizes up to  $1\frac{1}{8}$  in. deep, either right or left hand, and with any practical number of threads and any lead and pressure angle. The capacity is for work up to 8 in. in diameter and 24 in. in length between centers. One side of the thread is ground and the worm then turned end-for-end for the grinding of the opposite side of the thread. The grinding wheel operates while the table is traveling in one direction and is withdrawn while the table returns. Multiple-thread worms are indexed during the return stroke.

*WORMS With Threads Up to  $1\frac{1}{8}$  In. Deep, Either Right or Left Hand, and With Any Practical Number of Threads and Any Lead and Pressure Angle May Be Ground. The machine swings work up to 8 in. diameter, 24 in between centers*



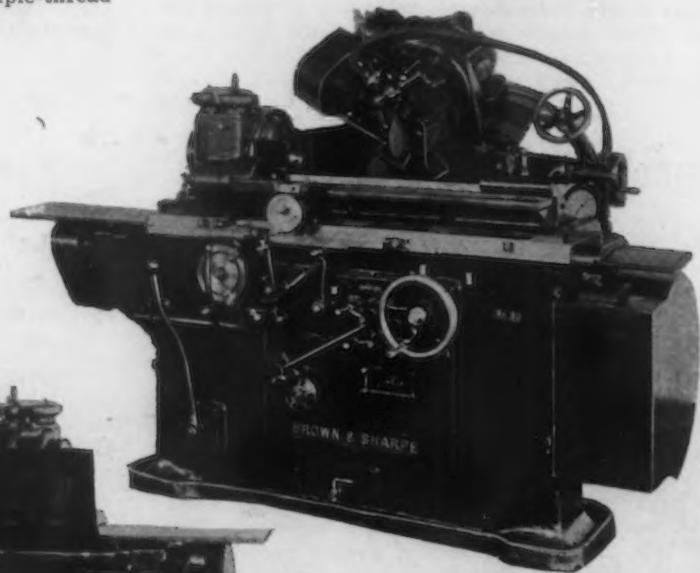
The arrangement of the machine, which is designated as the No. 30, may be noted from the illustrations. The wheel spindle is mounted on the upper of two slides the lower of which is fed to and from the work automatically by a hydraulic piston arrangement. A travel of  $1\frac{1}{4}$  in. is provided so that the wheel may clear the work while the worm is indexing and the table returning to the cutting position. The wheel spindle may be swiveled through 180 deg. for the grinding of worms of either hand. A diamond, which is adjustable to the required pressure angle, is used to maintain the correct shape of the wheel. The wheel is moved into the diamond and therefore is always in proper position relative to the worm center line. The wheel spindle is inclosed in a water-tight steel sleeve, the front box being of bronze and the end thrust taken by a ball thrust bearing. The belt pull is taken on ball bearings and provision is made for adjustment for wear.

Power is supplied by two electric motors. One, a 5-hp. dynamically-balanced ball-bearing motor is mounted on the wheel slide and drives the wheel spindle through a belt. The second motor, of 3 hp., on the rear of the machine, furnishes power for the remainder

of the mechanism. Both motors are controlled by a push button starter box.

Control of the table travel is by adjustable dogs. Ten table feeds are provided, and the change from one feed to another is made by turning a handle located conveniently at the front of the machine. The depth of cut is controlled by moving the table endwise toward the grinding wheel. This may be done by hand or automatically after each complete revolution of the worm. Throw-out shoes on the feed ratchets permit of grinding pre-determined limits.

Indexing is accomplished by change gears on the left-hand end of the bed. A safety device has been incorporated to prevent indexing of the work while the wheel is grinding and to keep the wheel from moving into the cutting position before the indexing is completed. The piece is indexed after each pass of the wheel so that any variation due to wheel wear is distributed over the different threads of the worm being ground. The correct lead is obtained by change gears on the right-hand end of the machine.



The headstock spindle has a 3-in. diameter hole so that if centers are not used, worms with shafts 3 in. or less in diameter can be ground from their own journals. One end of such a shaft may be inserted in a bushing in the headstock, and a special footstock with another bushing used to support the other end.

A simple hydraulic arrangement is employed for withdrawing the wheel slide during the return stroke of the table. It is controlled automatically by a rotary valve and company's standard No. 3 pump. The length of movement is constant and the slide is held under pressure against fixed stops at one end of the stroke for grinding and at the other end, for indexing. Fine adjustments are obtained by screws independent of the hydraulic movement.

### New Welding Electrode

A welding electrode which is said to combine the characteristics of a fluxed electrode and the quality of bead finish and the cleanliness in handling of a bare welding electrode, is obtainable from the merchandise department of the General Electric Co., Bridgeport, Conn.

This electrode, intended for use in the welding of steel, has a uniform flowing quality, and the absence of sputtering or spattering is a feature stressed. Deposit of more material with the same consumption of electrode per kwhr., is attributed to elimination of the erratic arc condition. Rapid penetration, high tensile strength and unusual ductility and elongation are also claimed for the new electrode, which is designated as the type F. It is available in  $3/32$ -,  $1/8$ -,  $3/16$ - and  $1/4$ -in. sizes in standard packages of 50 lb. burlapped. The material is also furnished on steel reels, approximately 200 lb., or in coils of about 150 or 200 lb.

## BEVEL GEAR GENERATOR

### New Unit for Rough and Finish Cutting of Large or Small Lots of Straight Bevel Gears

SMOOTH, fully-automatic operation and quick set-up are features of the 12-in. straight bevel gear generator here illustrated, which is a new design being offered by the Gleason Works, Rochester, N. Y.

The machine generates the teeth of the gears with two tools, the same basic principle being employed to obtain the tooth shape as in other Gleason bevel gear generators. It is offered as a complete unit for the rough and finish cutting of either large or small quantities of gears, on a quality basis and at faster speeds. This applies to gears having a cone distance of 8 1/4 in. or less, ratios up to 10-to-1 and pitches of 3 diametral pitch and finer.

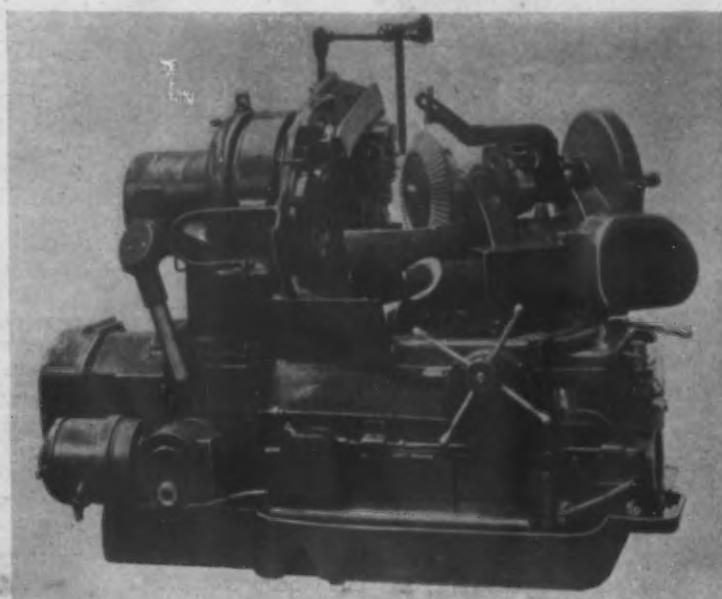
The drive for the tools is arranged to give the effect of a draw out, and on the return stroke each tool is mechanically relieved a small amount from the cutting surfaces. It is stated that as a result of the arrangement, work of fine quality may be produced with high tool speeds. Tool holders are case hardened. The bearing surfaces of the tool-carrying slides and arms are arranged to overrun each other. One large gib is provided on each slide to take up the wear in all directions.

A powerful and rigid support for the work head has been obtained by bolting the head base to a large sliding plate which moves on straightways at right angles to the root line. The head can be conveniently withdrawn 5 in. to clear the tools. This is stressed as an advantage in removing the work and as permitting inspection of the first tooth for size and finish without indexing around to a convenient position.

The correct ratio of generating roll of tools and work is obtained by means of change gears. The indexing is accomplished with a mechanism of the stop-wheel type. The index change gears function also as gears in the generating train, and are therefore constantly in operation. The double-roll generating method used is said to give a better quality of finish. By the method, the rough finish taken over the tooth while the tool head is swinging in one direction, is followed by a light finish cut as the tooth is being completed on the return roll.

The feed cam has two tracks, one for roughing without the generating roll, and the other for finishing with the roll. Simple and convenient means are provided for engaging the cam roller with either of these tracks.

Generator tools of high-speed steel are employed, these tools being interchangeable with those used on the company's 8-in. manufacturing and 18-in. bevel gear generators. When making a set-up, the tools and work are placed quickly in cutting position by means of simple gages. Slight movements are transmitted by a sensitive finger which indicates, by a zero line at its longer end, when the setting is correctly made. A special stock dividing gage is provided for use in mounting gears for finishing. This gage serves to locate the teeth so that equal amounts of stock may be removed from each side of a tooth regardless of stopping position of



*The Drive for the Tools, Arranged So That Quality Work Can Be Obtained With High Tool Speeds, Is a Feature*

machine. Feeds in time per tooth range from 14.2 sec. to 2 min. 5 sec. Seventeen tool speeds, ranging from 42 to 333 strokes per min. are provided.

The machine is for the most part lubricated automatically. Other parts are lubricated by a "one-shot" system using a manually operated plunger pump. Both of these systems are equipped with oil filters. The pump for cutting oil has a capacity of 5 gal. per min. Adjustable splash guards are furnished for controlling the return of the cutting oil. Chips drop into a large pocket which is accessible and may be cleaned out conveniently. Standard machines are arranged for either belt or motor drive. The drive of the machine illustrated is by means of a 5-hp. motor of the built-in type.

### Stationary Tachometers for Use on Turbines and Other Machines

A stationary tachometer for use on turbines, centrifugals and other machines is being placed on the



*The Dial Is 6 In. in Diameter and the Aluminum Housing Is 2 1/4 In. Deep*

market by the O. Zernickow Co., 15 Park Row, New York.

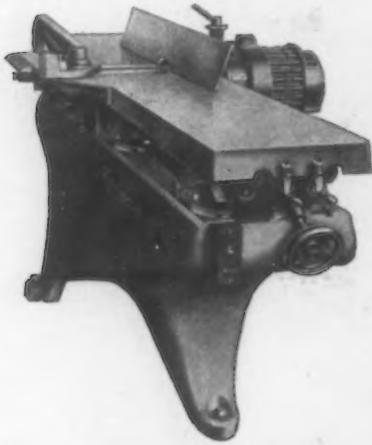
The operating principle is similar to that employed in the company's hand tachometer previously described in THE IRON AGE. The instrument is claimed to be free running, dead-beat sensitive and accurate to within  $\frac{1}{2}$  of 1 per cent within any point of the scale. The standard range is from 2 to 16 times the minimum speed either for r.p.m. or f.p.m. speeds. For example, 100 r.p.m. minimum speed and 200 r.p.m. maximum speed is a range of 1:2 and 100-1600 r.p.m. is a range of 1:16. Higher ranges may be furnished to order.

Two models are available, one of which has the indicating hand mounted in the center and a circular graduation over the entire circumference of the dial. This type is recommended for normal conditions and where a long, open scale is desired. The model B instrument, designed for rougher uses, has the hand mounted below the center of the dial and has a semi-circular graduation. A spring belt is recommended for driving these tachometers, although direct connected or flexible shaft drives may be provided. The dial of the instrument is 6 in. in diameter, and the aluminum housing is 2 1/4 in. deep. The net weight is 2 1/2 lb.

## Ball-Bearing Jointer with Three-Knife Motorized Head

The American Saw Mill Machinery Co., Hackettstown, N. J., is adding to its line the 12-in. Monarch ball-bearing jointer here illustrated, which incorporates several features intended to facilitate operation.

The machine is available with a three-knife motorized head or with pulley for belt drive, and with steel table lips or with plain tables. The frame is a one-piece casting, with wide-spread feet at the feeding-out end and one central leg at the feeding-in end, which arrangement is intended to give clear foot room for



*Freedom of  
Obstruction to  
the Operator.  
Three - Point  
Floor Contact,  
and Tilting  
Table and  
Safety Guard  
Are General  
Features*

the operator. The tables are heavily ribbed and accurately finished. The feeding-in table is 48 in. long and 15½ in. wide, and the feeding-out table is 36 in. long and 13½ in. wide. The feeding-in table may be tilted at an angle of 5 deg. from horizontal for pattern draft or other taper work, the table being tilted by means of the crank shown at the right-hand end.

A feature stressed is the design of the safety guard. When in the operating position, this guard covers the head close up to the work passing through, adjusting itself to any width. When not in use, it can be held open by means of a latch. It can be thrown over entirely out of the way for rabbetting without removing it from the machine, and when brought back into position it is ready for immediate use. The fence is actuated by means of rack and pinion, and when in position it is clamped securely. The fence has adjustment for alinement with the rabbetting edge of the table. It tilts to any angle to 45 deg. from the vertical with positive stops for these two positions. It has parallel traverse across the table.

The head, of improved design, is mounted in a heavy yoke which is doweled and bolted directly to the bed. It is a solid forging 5 in. in diameter and is fitted with three high-speed knives. Provision is made for knife adjustment, and for excluding dust from the bearings. For connection to a factory exhaust system a cast-iron hood or chute is fastened to the under side of the yoke inside of the base. For individual exhaust, a fan of special design is mounted inside of the frame and driven by belt from the head shaft.

The overall length of the machine is 89 in. and the width, over the motor and rabbetting arm, is 38 in. The weight of the machine is 1600 lb.

## Cincinnati Planer Co. to Build Whipp Crank Planers

The Cincinnati Planer Co., Cincinnati, has purchased from the Whipp Machine Tool Co., Sidney, Ohio, the patterns and drawings of its new 26-in. and 36-in. open-side crank planers, as well as the old patterns and drawings which will be used to supply repair parts to users of these machines. These machines will be manufactured by the Cincinnati Planer Co. at its Oakley plant and become a part of its regular line.

The United Metal Trades Association of the Pacific Coast will hold its annual convention in Portland, Ore., on April 15 and 16.

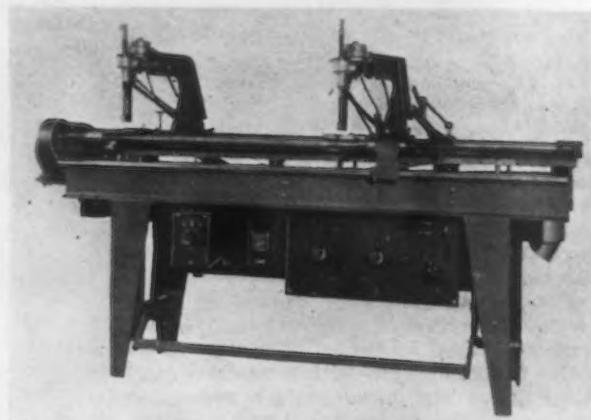
## Butt Welding Machine Employs Carbon Arc Process

Butt welding equipment employing the electric arc as the source of welding heat has been brought out by the Lincoln Electric Co., Cleveland. Butt welding has usually been done with the resistance type of electric welder, so that the use of a machine of the type here illustrated will be recognized as a departure.

This arc butt welding machine is designed to weld one tube section to another, or one tube section to a solid section. The welding heat is applied to the joint by the carbon arc and the tubes or bars revolved to distribute heat uniformly. Pressure is applied to squeeze out the slag and complete the fusion. Both ends of a tube may be welded simultaneously by the use of the two automatic heads on the machine.

Tubes up to and including 8 in. in diameter, 60 in. in length, and with wall thickness up to ½-in. may be welded on the machine. It is claimed that in welding tubing of maximum wall thickness, ½-in., at the rate of 40 ft. per hr., the power input to the machine is approximately 23 kwhr. for each hour of continuous operation on each of the two welding heads. It is further stated that the power load is the same as any standard motor load.

Pieces to be welded may be held in one of several ways, according to the nature of the work. In welding a plug-shaped piece into a tube, the pieces are held with spring checks, and where necessary, supports are



*One Tube Section May Be Butt Welded to Another, or  
One Tube to a Solid Section. The electric arc is used  
as the source of welding heat*

provided between the spring checks. These spring checks serve to apply heavy pressure to the weld. Because of the high speed of the welding operation the weld remains at high temperature all the way around, so that the heavy mechanical pressure squeezes out slag and gas pockets.

The machine is of welded steel construction. The floorspace occupied is 4 ft. x 10 ft., and the head room required is 6 ft.

## Shepard to Make Sprague Hoists

The entire Sprague portable hoist business of the General Electric Co. has been taken over by the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y. The change takes place April 1.

Sprague hoists have been built in the Bloomfield plant of the General Electric Co. since 1903. The Shepard Co. will continue the manufacture of this line and has established for this purpose a division known as the Sprague hoist division of the Shepard Electric Crane & Hoist Co., with offices at 30 Church Street, New York. N. A. Hall, of the General Electric Co., will take charge of the new Shepard division, after 14 years of service with General Electric Co.

The Shepard company will furnish spare parts for obsolete types of Sprague hoists as well as for the current line. The General Electric Co. will continue to manufacture the parts for motors, and parts for controllers and brakes, but this business will be handled commercially by the Shepard company.

## Improves Bench Measuring Machine

An improved model of its Super-Micrometer, a tool for making linear measurements rapidly to an accuracy of 0.0001 in., has been brought out by the Pratt & Whitney Co. division of the Niles-Bement-Pond Co., 111 Broadway, New York.

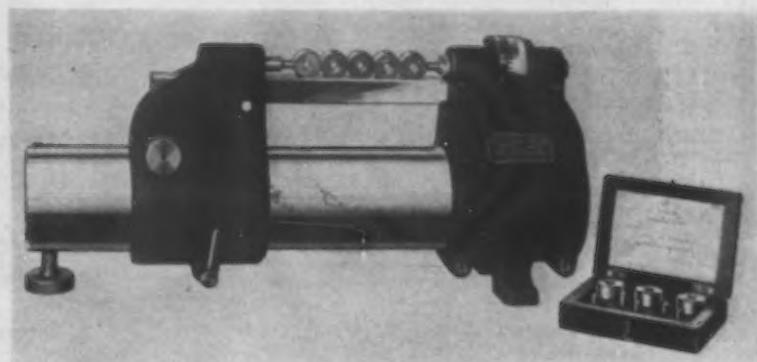
Like the previous model, described in **THE IRON AGE** of Aug. 31, 1922, the new instrument is intended for use as a shop tool, and is arranged for mounting on a tool maker's, inspector's or other bench. It is offered for production gaging in the intermediate field between the ordinary micrometer and the company's standard measuring machine, which, being accurate to 0.00001 in., is too fine for ordinary shop use.

Redesign of the head is one of the improved features of the new Super-Micrometer, which is designated as the model B. Moving parts, including the compensator, are entirely inclosed, which arrangement is intended to eliminate the wear caused by the accumulation of room dust and abrasives upon the parts formerly exposed. The tailstock has been made stiffer and heavier, and it is claimed that the feel of the anvils and the work coming into contact is more pronounced than in the previous model. The tailstock outlines have been made symmetrical with the headstock, and thus the appearance of the instrument improved. In the new model the bar or support, in which the standard disks are placed when setting the machine, is soft instead of hardened. This is intended to remove a possible cause of damage to the standards through accident or carelessness. The graduations on the dial and vernier are about 1/10 in. apart, instead of 1/50 in., as formerly. The calibration or reading, 0.0001 per graduation, remains the same.

In the series B Super-Micrometer, the dial is approximately half the size of that on the previous model. It was found that many operators were using the large graduated dial to the neglect of the smaller knurled wheels for operating the machine, a practice which resulted in tarnished dials, undependable readings, and in general defeated the purpose of the design. The graduated dial is now provided with a

small knurled portion which will serve as a finger-hold, thus eliminating the necessity of handling the graduated portion of the dial.

The vernier scale is provided with an adjustment for bringing the zero lines into agreement. This adjustment is made by means of a thumb screw, which is connected directly with the vernier. The eight standard inches which are supplied with each machine are



*The Head Has Been Redesigned and Moving Parts Inclosed. Change in the graduations on the dial and vernier from 1/50 in. to about 1/10 in. apart are among other improvements*

now furnished in a box, entirely separate from the machine. The box can be kept in the tool crib or in the foreman's desk, thus removing the possibility of loss which occasionally occurred with the supplanted method of storing them on a pin attached to the machine. The new method also eliminates the possibility of abrasion of the finished faces of the standard when removing or replacing the cover which was provided to protect them from dust.

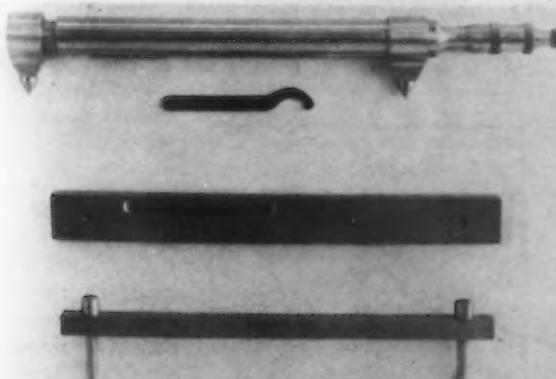
The accuracy of the Super-Micrometer depends upon the standard inch and measuring screw. The standard inch is a cylindrical gage of alloy steel, hardened, seasoned and machine lapped. It is accurate within ten millionths of an inch. The measuring screw is hardened, seasoned, ground and lapped. It is cut on a special precision machine as in the previous model.

The machine has a range of 8 in. between anvils, 2 1/4 in. between the spindle center and the top of the work tables, and 3 1/4 in. over the bed. The setting up of the machine is simple, as previously described.

## Gage for Measuring Deflection of Girder, Bridge and Other Spans

The Howard strain gage pictured herewith, designed to measure the deflection in bridge spans, steel girders, dams, etc., is being made by the Brown & Sharpe Mfg. Co., Providence.

The tool is, in effect, a bar micrometer. It is ad-



*The Strain Gage Is in Effect a Bar Micrometer. A straight steel bar with prick punches in each end, and a test bar for checking the micrometer are part of the equipment*

justable for measurements of any length within a range of 10 to 20 in. and has a capacity of 0.004 in., reading to 0.002 in., by ten-thousandths, either side of zero.

In using the micrometer, two points are first located in the span to be measured, while it is in normal position. To aid in establishing these points a straight steel bar having a hardened steel prick punch in each end is furnished with the micrometer, and in locating the required points this bar is held in position and the punches tapped with a hammer. The distance between the two points is then measured and again while the span is under load. From any difference between the two measurements the desired information can be computed. The assumption is that the span will deflect while carrying a load and this deflection will force the two points out of their former positions, bringing them closer together or spreading them farther apart, depending on whether the points are established above or below the center line.

Being required to measure exceedingly small distances, close accuracy is demanded of the tool. To assure maintenance of accuracy, a steel test bar is furnished with the micrometer. With the test bar at a normal temperature the micrometer can be checked with it and corrected in accordance with any climatic variation. The test bar also serves as a gage to align the prick punches properly when they are sharpened or ground.

As the moment of inertia will vary according to the particular conditions of the span to be measured, no hard and fast rule governing the exact location of the points between which the measurements are taken can be made. Accordingly, these points must be located in such a place that the desired information may be computed, because in the deflection of any span two forces are at work in opposite directions, one compression and the other expansion.

# Business Analysis and Forecast

BY DR. LEWIS H. HANEY  
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

## Favorable and Unfavorable Factors Affecting Business May Be Summarized as Follows:

### Favorable Factors

1. Gain in employment and in labor purchasing power.
2. Large volume of retail trade and bank debits.
3. Increase in building activity and automobile production in February.
4. Somewhat greater stability in commodity prices.
5. Easy money; high Federal Reserve ratio.
6. Gain in new enterprises.
7. Strong financial position of most leading companies.
8. Light mercantile inventories.

### Unfavorable Factors

1. Decline in contemplated new construction.
2. Severe competition in the automobile industry.
3. Low farm prices and agricultural purchasing power.
4. Over-production of oil and copper.
5. Manufacturers' inventories large.
6. Increase in business failures.
7. Low unfilled steel orders.
8. Prospective coal strike.
9. Disturbed conditions in Mexico and China.

**S**OME improvement appears this month in the balance between favorable and unfavorable business factors. A fair seasonal recovery is on, and, though some further irregularity and recessions appear to lie ahead, no sharp decline is in sight. The possibility exists of an upturn in business this fall.

DESIGNED to show the general trend of business and industry, and to reflect the general business cycle, the first chart has as its outstanding feature a new high level reached by bank debits. The average weekly volume of checks drawn in February, making allowance for seasonal conditions, exceeded even the peak reached last August. It was the highest on our record. The fact is the more impressive because there has been no advance in commodity prices.

A part of the gain in bank debits is due to the large volume of trade on the New York Stock Exchange, where there has been an unusual number of two-million share days, with stock prices sustained at high levels. Retail trade, too, is in large volume and gained in February, although it did not reach the volume attained in December. Trading in real estate has also increased in volume. In February it was little lower than the record levels in the early part of 1924 and of 1926. It can hardly be doubted that trading and speculation are very active.

At the same time, the freight traffic of the railroads, allowing for the merely seasonal ups and downs, has been a little lower than it was in November and December of last year. In February it recovered a part of the January decline and was considerably above a year ago. But, aside from the abnormal heavy coal traffic of recent months, the freight tonnage of the railroads has not made a particularly impressive showing.

The statistical facts are as follows: February car loadings exceeded the level of a year ago by 4 per cent; bank debits, by 6.7 per cent; tonnage of freight hauled, by 7.5 per cent. Clearly, business was more active last month than it was in February, 1926.

### Upward Trend Becoming Irregular

Neither is there any clear indication of a change in trend. The rise in the bank debits curve has become more irregular and the general upward trend is less sharp. It is, moreover, getting out of line again with

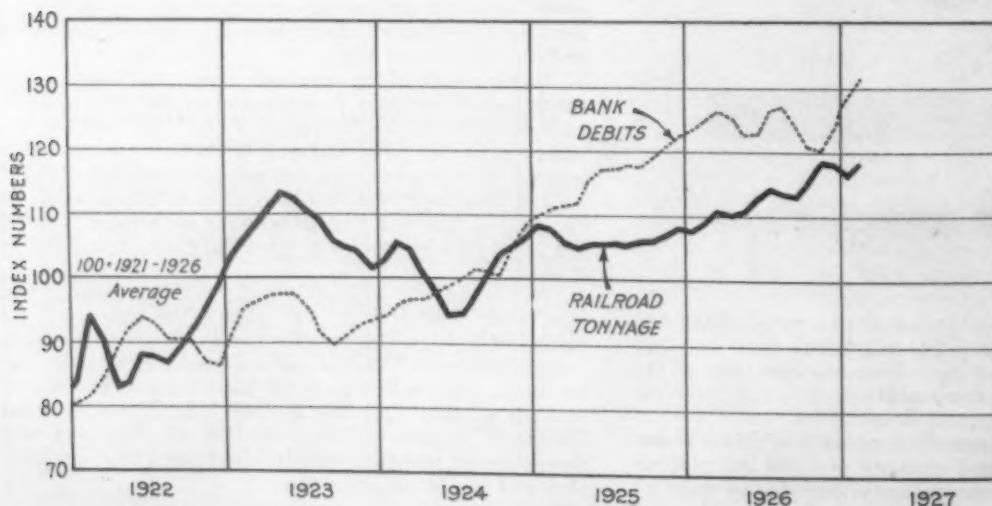


Fig. 1—Railroad Tonnage Returns and Those for Bank Debts Indicate That Trading and Speculation Are Exceptionally Active. That bank debits are far above physical volumes of activity is a most unsatisfactory element

# In This Issue

*Business situation looks brighter.*—New enterprises are increasing in number, employment is gaining, freight traffic is holding up, and the volume of checks is encouraging. Dr. Haney looks for an upturn in the fall.—Page 944.

*Much money lost by skimping on heat-treating equipment.*—One plant saved \$500 per month in gas consumption alone by installing modern annealing furnace. Heat-treating department is too often regarded as the plant "step-child," having high operating costs because of manufacturer's failure to provide adequate equipment.—Page 918.

*Declares gray iron can be melted more economically in electric furnace than in cupola.*—Electric furnace will take all-scrap charge, and unless current rates are high, electric product is said to be cheaper.—Page 919.

*Over \$23,000 per year may be saved by equipping 100-ton open-hearth furnace with recuperators.*—Without waste-heat boilers, heat lost up the stack amounts to 4000 tons of coal per year. Recuperators would save most of it.—Page 920.

*Claims important economies for user and maker of round bars by centerless grinding.*—As this operation is accurate to 0.0005 in., user can assemble bar stock directly into the machine. Bars up to 4 in. diameter can now be centerless ground.—Page 927.

*Hand-to-mouth buying taken into consideration in designing this new rolling mill.*—It rolls shapes, rounds, squares and flats. Flexibility is expected to enable it to pay high returns on capital invested.—Page 923.

*Milling machine makers agree on standard spindle end.*—Committee of engineers pool their experiences and submit a common design, which has been accepted by machine tool builders. Thus, a recommendation made 23 years ago by William Lodge becomes an actuality.—Page 931.

*Supply a gas-free copper, says new head of British Institute of Metals.*—Oxygen in copper is one of the worst impurities the bronze founder meets with, for, when tin is added, stannous oxide is formed, causing flaws in the casting.—Page 932.

*Sharp drop in iron and steel exports and imports.*—February shipments from this country abroad were almost 30 per cent under January, while imports fell off 28 per cent.—Page 934.

*Steel should not be heated much above 2100 deg. Fahr. in forge furnaces.*—High temperature decarburizes and weakens the steel, at the same time increasing the grain size.—Page 919.

*Declares electric furnaces for melting brass justify their installation on the basis of saving metallic losses.*—In fuel-fired furnaces loss often runs as high as 3 to 6 per cent, says electric furnace manufacturer. In electric furnaces the loss is said to average less than 1 per cent.—Page 919.

*Cost of carburizing can be cut in half in some plants.*—Some people pay 9 to 12c. per lb. for carburizing, when it can be done for 6c., metallurgist asserts.—Page 918.

*With Welsh competition active again, will American exports of tin plate continue at record-breaking rate?*—Over 223,000 tons was exported in the eight months ended Feb. 28, establishing a new high record.—Page 954.

*Average consumption of bituminous coal after April 1 will probably not even equal capacity of non-union mines.*—Potential weekly output is estimated to be 10 million tons, with consumption about 9 1/4 millions. Reserve stocks estimated more than 70 millions, highest on record, and 20 millions more in transit.—Page 950.

*Has per capita wealth decreased in 13 years?*—While population increased 21 per cent between 1912 and 1925, wealth gained only 19 per cent, National Industrial Conference Board estimates.—Page 953.

*Steel output may taper off for a few months, says Dr. Haney.*—However, steel production is so little above the estimated normal requirements of the country that no sustained setback seems to be ahead.—Page 947.

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**"The little green slips have become  
a necessary part of our daily routine."**

**S**O writes a Chicago manufacturer regarding the slips furnished him for routing THE IRON AGE through his organization. These slips are furnished gratis to each subscriber. They are specially printed in each case, and bear the name and title of each executive who finds useful information in this publication.

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Subscribers who adopt the use of the slips for the sake of economy and convenience frequently find an unexpected added benefit in the way of improved esprit de corps. Perhaps this is due to the focussing of many minds upon the same information source.

*For News Summary See Reverse Side*

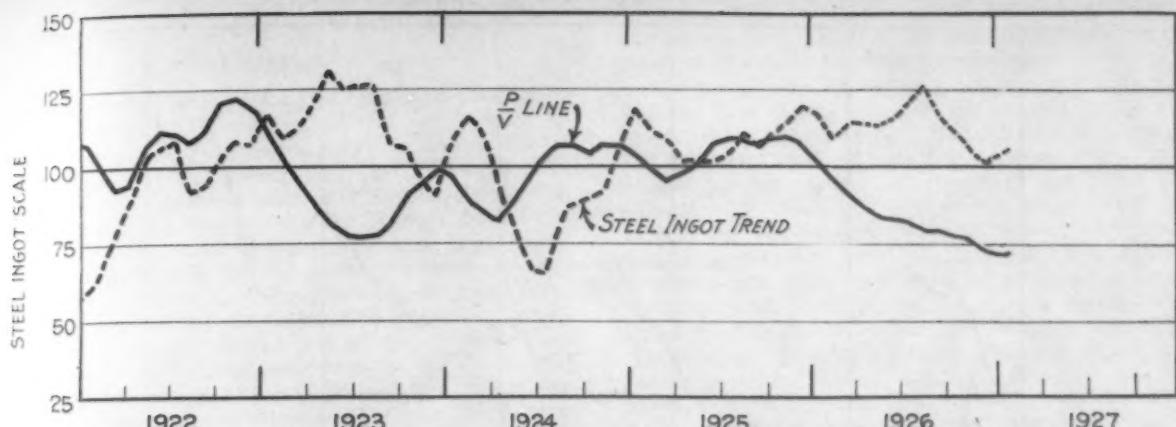


Fig. 2—Continued Dropping of the P-V Line, Which Has Persisted for More Than a Year, Has Now Ceased and There Are Signs of an Upturn. Representing the ratio between commodity prices and the physical volume of trade, it generally anticipates the trend of business by about five months. The steel ingot curve, after falling sharply for several months, has had a slight recovery since December

the physical volume of business, as measured in tons of freight traffic. But the trend is still upward. The freight traffic curve shows signs of rounding off and the volume has been sustained by the fear of a coal strike. It will probably show a decline in April.

The most unsatisfactory part of the situation, however, is the fact that bank debits are so far above the indexes of physical volume. This is not a sound condition, nor is it one which can continue for long. There must be a relation between the volume of business as measured by bank checks and the volume of business as measured by production or shipments of commodities. It seems probable, therefore, that the excess of bank debits will require some liquidation later on, just as it did in the second half of 1926.

### High Steel Activity May Taper Off

HERE was a small gain in ingot production during January and February, as shown in our second chart, which was greater than usually occurs during those months. This, we take it, reflected the slight hump in the P-V line that came about October last year, and which would have been even greater had it not been for the abnormal volume of coal.

We continue of the opinion that the recovery in ingot production will not gain the momentum that it did in early 1924, but that after March it will taper off. This opinion does not involve a pessimistic outlook, however, for signs of an upturn in the P-V line have already appeared.

### Steel Industry in Favorable Position

And there seems to be no reason why the steel industry, even if it recedes somewhat during the course of the next two or three months, should not pick up again in the autumn. Curtailment in production in recent months has strengthened markets for commodities in general, and, with steel production so little above the estimated normal requirements of the country, the industry is in a position to show real improvement on any gain in the general situation.

We think that the total volume of steel production for 1927 will be considerably smaller than that for 1926, and that our adjusted ingot curve will probably fall somewhat below normal during the mid-year period, but no sustained or drastic setback seems to lie ahead.

### Construction and Automobiles Gain in Volume

THIS general position is sustained by the most recent data concerning the automobile and building industries. In February there was recovery in these two key industries, which explains a part of the recent gains in steel production. As shown in the third chart, both of the industries mentioned gained more than usual for the season. The floor space in building contracts last month was almost exactly the same as in February, 1926. Automobile production was about 15 per cent under the level of a year ago. In view of the fact that building activity in February, 1926, fell sharply to a point far below the peak, it will be seen that the present position of these two industries is not such as to indicate as high a level for 1927 as that of last year.

Building activity shows an irregular, uncertain trend. As contemplated new construction fell off last month, and residential rents continued their downward trend; it remains probable that some further decline in building activity will appear. The automobile business reaches its seasonal peak in April. The February volume was about normal and present indications are that the upward trend in that month will continue through March and perhaps April. But the highly competitive situation in the automobile industry is likely to lead to some over-production that will require curtailment thereafter.

Economies in production by the leading large automobile producers has allowed them to make good profits, even at reduced prices; but competition is so keen and conditions in the industry are so unstable at present that the future is highly uncertain. Until the Ford problem is solved, and several of the struggling

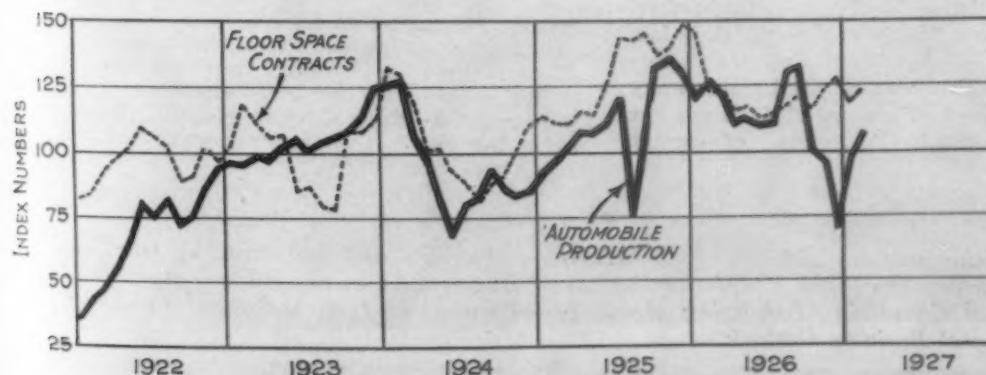


Fig. 3—Building Construction and Automobile Production Show Respectable Gains. But it is probable that neither will hold as high an average level in 1927 as last year

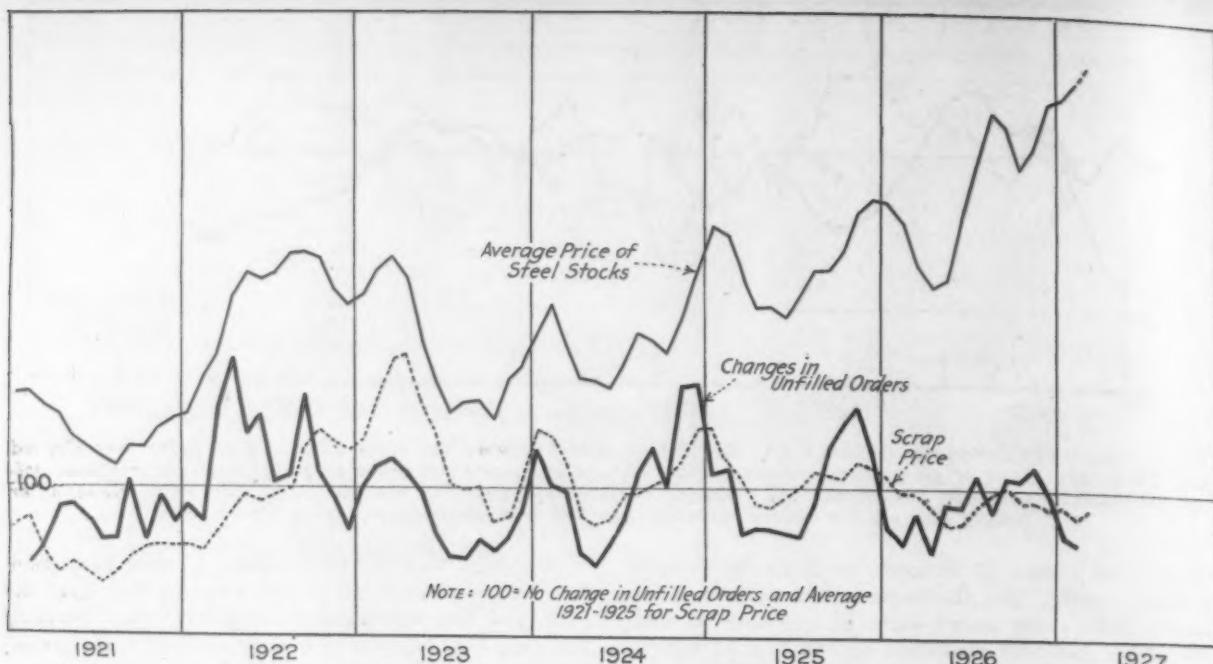


Fig. 4—Changes in Unfilled Orders and the Price of Heavy Melting Steel Both Hold Low Levels, After Allowing for Seasonal Influences. Steel stocks, on the contrary, have reached higher and higher levels, which, perhaps, cannot be maintained

small companies are eliminated by merger or otherwise, there is a probability of overproduction and price cutting.

#### Steel Stock Prices Thought Unduly High

IT must be admitted that February and March data appear to furnish another illustration of the occasional lapses of statistical barometers. In spite of the decline in the unfilled orders barometer and in scrap prices, steel stock prices, though irregular, have averaged higher. To be sure, there are explanations, but the fact remains that at least one exception seems to have appeared. We say "seems," because some possibility of a decline in steel stocks still exists, though this at present does not seem probable.

The explanations are as follows: First, the anticipation of a coal strike has driven in some buying of steel securities. Second, orders for finished steel increased in February and notably in the case of structural steel and fabricated steel plates. Third, some allowance must be made for the stock dividend declared by the United States Steel Corporation, and also hopes for improvement in the stocks of some of the other steel companies, based on favorable 1926 earnings statements.

#### Great Activity Has Eaten Into Backlogs

But the fact is that steel stocks as a group reached a new high in the third week of March. At the same time there was a decline in unfilled orders that was sufficiently large to carry the rate of change line lower in February, as shown in the chart. And heavy melting steel scrap averaged lower than in any month since last June. Probably the discrepancy means in part that actual orders, as distinguished from unfilled orders, were larger in February than in any month since last September, and that this has outweighed the decline in the unfilled orders that was caused by the heavy volume of production and shipments. This is another illustration of the increasing importance of current buying.

From the cold, statistical point of view, one would consider steel stock prices as a group high enough, but pending more normal conditions, it would be impossible to express any opinion as to the trend during the near future. That would be mere speculation.

#### Colorado Mill Rolling Structural Steel

The Colorado Fuel & Iron Co. put into operation on March 21 a new rolling mill, which besides being designed to roll structural shapes can also produce tie plates, large squares and rounds and miscellaneous products such as are demanded in the territory which the company serves. The mill is equipped to produce I-beams, channels up to 18 in., angles, etc., but its housings have been made of sufficient size so that, should the demand develop, it would be easy to equip the plant with larger rolls and pinions and beams could be produced as large as 27 in. Rather than being strictly a structural mill, the new addition is in the nature of a combination mill, as indicated.

#### New Structural Steel Specification Adopted by St. Louis

The standard specification for the design and erection of structural steel, as formulated by the American Institute of Steel Construction, becomes a part of the St. Louis building code as the result of an ordinance recently passed by the City Council and signed by the mayor. All designs for steel construction in St. Louis are being based upon the specification.

The institute's specification is now in use in more than 100 cities in the United States and Canada. Substituting a working stress of 18,000 lb. per sq. in. for the old stress of 16,000 lb., it is estimated by the institute that the application of the specification makes possible a saving of from 10 to 12 per cent in the amount of steel required for any given structure.

Among the cities which have recently authorized the use of the specification are Pittsburgh, San Francisco, Omaha and Youngstown.

*Schedule of the next installments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows: April 14—Activity in Steel Consuming Industries; April 21—Position of Iron and Steel Producers; April 28—General Business Outlook.*

## Marked Activity in Youngstown District

YOUNGSTOWN, March 29.—Iron and steel production this week holds at 83 per cent in the Valley, with 45 of 53 independent open-hearth furnaces active, 110 of 127 sheet mills under power, and 13 of 18 tube mills rolling. This is one less pipe mill than the preceding week. Activity of independent bar mills is at 65 to 70 per cent, a sharp increase from the low of last December, when production sagged to 30 per cent and less. The Carnegie Steel Co. is maintaining its steel plant at 90 per cent and its bar mills at 85 per cent.

Effect of the coal miner's strike, scheduled to start April 1, has been largely discounted by the steel trade. Blast furnaces and rolling mills have built up coal supplies until they are well fortified for about 90 days in this area. This supply, together with coal which will come into the district from regions unaffected by the proposed strike, will enable the mills and furnaces to operate through the summer, without serious interference to operations, it is predicted.

At the present time, there is considerable weakness in butt-weld steel pipe and some idle capacity. The Youngstown Sheet & Tube Co., for instance, is operating eight of 15 tube mills in this section. The demand for lap-weld sizes of steel pipe is likewise off, though mills are well occupied at present. The Sheet & Tube company continues to operate its seamless tube mills at a capacity rate.

The A. M. Byers Co. is maintaining its hand-puddling plant at Girard on a capacity basis, operating all of its 88 puddling furnaces.

Automobile makers are active factors in the current market and their demands for highly finished sheets are creating favorable backlog for the mills.

Orders now on the books of the Trumbull Steel Co., Warren, are the heaviest in its history, states President John T. Harrington. Unfilled orders aggregate 150,000 tons, which if specified against, would insure capacity operations for the company for about three months. This unfilled tonnage has been built up in face of the maintenance for some time past of production at a capacity rate. The company, for example, has been operating its hot rolled strip mills through Saturday and Saturday nights during recent weeks, suspending Sunday morning and resuming again Sunday evening. Since the first of the year, prices in the hot strip market have firmed about \$4 per ton, while the sheet and tin plate markets are also firmer. Trumbull's 36-in. strip mill, now under way, will be completed and ready for operation about mid-year. Last week 75 carloads of material were received for this unit. The electric equipment is being supplied by the General Electric Co., and the housings and rolling mills by the United Engineering & Foundry Co.

In line with its policy of localizing its manufacturing facilities as much as possible, the Truscon Steel Co. will this year erect along the Pacific Coast a \$200,000 manufacturing unit, to supply its far Western warehouses. The company reports a substantial acceleration in new business the past 10 days, principally for steel materials required in building construction. Most of its tonnage for the South is coming from the vicinity of Birmingham.

## Discussed Standardization of Billet Reinforcing Steel at Washington, March 19

FRONT Row (Reading Left to Right): M. A. Beeman, Concrete Reinforcing Steel Institute; Richard W. Johnson, Concrete Reinforcing Steel Institute; Leslie Berry, Southern Engineering Co.; George R. Brewer, Brewer & Co., Inc.; D. B. Knowlton, Didley Bar Co.; John F. Glenn, Kalman Steel Co.; W. H. Pouch, Concrete Steel Co.; W. C. Wetherhill, Director, National Committee on Metals Utilization; George E. Routh, Jr., Kalman Steel Co.; A. E. Lindau, American System of Reinforcing; C. Louis

Meyer, Concrete Engineering Co.; J. F. Curley, Concrete Steel Co.; Powell Pardee, Inland Steel Co.; Joseph A. Bell, Capital Steel & Iron Co.  
Middle Row (Reading Left to Right): E. W. Langdon, Joseph T. Ryerson & Son, Inc.; Ralph F. Healy, Igoe Bros.; T. R. Lyons, Concrete Steel Co.; William L. Blaum, New York State Department of Public Works; O. L. Grover, United States Bureau of Public Roads and State Highway Officials' Association; Jesse J. Shuman, Jones & Laughlin Steel Corporation; L. H. Christen, Virginia Steel Co.; P. R. Bailey, Rosslyn Steel & Cement Co.

Charles F. Stone, Atlantic Steel Co.; H. W. Van Benschoten, Knoxville Iron Co.

Top Row (Reading Left to Right): L. E. Kern, American Institute of Architects; H. J. Burt, Consulting Engineer; M. C. Shannon, Gulf States Steel Co.; Maurice J. Quinn, Concrete Steel Fireproofing Co.; B. L. Hagberg, Kalman Steel Co.; E. W. Ely, Assistant Director, National Committee on Metals Utilization; F. W. Youry, Truscon Steel Co.; H. A. Stacy, Metals Committee of Federal Specifications Board; H. A. Tuke, Truscon Steel Co.



## RATE HEARING CONCLUDED

### Pittsburgh Testimony Brings Out Charges of Discrimination In Favor of Other Steel Districts

PITTSBURGH, March 28.—The Pittsburgh hearing of the Interstate Commerce Commission in the general investigation of iron and steel freight rates in Official Classification territory was concluded on March 22. Commissioner Johnston B. Campbell, who presided at the hearing, announced that the next hearing would begin at Columbus, Ohio, on April 19, to be followed by sessions in Detroit beginning April 25, and at Chicago, starting May 12.

H. C. Crawford, assistant general traffic manager Bethlehem Steel Co., was the chief witness at the final session of the hearings here. His testimony was chiefly about freight rates west from Johnstown, Pa., and Buffalo, where plants of his company are located. Application of the Jones & Laughlin scale would be of little benefit on shipments from the Buffalo works, he said, and he urged that the present rate relation of Johnstown to Pittsburgh be maintained. This relation calls for 1½c. per 100 lb. over the Pittsburgh rate on westbound shipments and a like amount below the Pittsburgh rate on shipments east from Johnstown.

D. O. Hughes, secretary traffic committee, Pittsburgh Chamber of Commerce, testifying in behalf of that organization, pointed out many instances of apparent discrimination against Pittsburgh in favor of producing districts more remotely located from Eastern and Southern consuming points. He called attention to the fact that the Pittsburgh rate to New York, which is 2c. per 100 lb. higher than that from Buffalo, is increased 2½c. per 100 lb. for the additional haul to Boston, whereas only 1c. per 100 lb. is added to the Buffalo rate. Pittsburgh, 360 miles from Philadelphia, pays 32c. per 100 lb., the same rate as is charged on Buffalo shipments hauled a distance of 406 miles. The rate from either Buffalo or Pittsburgh to Roanoke, Va., is 38c. per 100 lb., although the distance from Pitts-

burgh is 433 miles, against 611 from Buffalo. Syracuse, N. Y., with a much longer haul, has a rate of 28.5c. per 100 lb. to Virginia cities, against the Pittsburgh rate of 38c.

Benjamin J. Brooks, representing the Cumberland Steel Co., Cumberland, Md., requested a restoration of the former rate from that point of 1½c. per 100 lb. above Pittsburgh on westbound shipments and a like amount under Pittsburgh on shipments east. K. M. Hughes, traffic manager McClintic-Marshall Co., and representing the American Institute of Steel Construction, criticized freight rates east from Pittsburgh as too high and also expressed opposition to the double minimum weight proposal advanced by F. A. Ogden, traffic manager Jones & Laughlin Steel Corporation, earlier in the hearing.

Among steel companies in this district the feeling is general that an excellent presentation was made in behalf of the Pittsburgh district. Comment has been especially favorable of the testimony and exhibits of the Steel Corporation, given by John A. Coakley, division freight agent American Steel & Wire Co., Cleveland. Summarized, Pittsburgh shippers made a strong plea to have freight rates so adjusted in relation to those in other producing districts that Pittsburgh district producers might find a market with less penalty than they now are subjected to in getting to consuming districts long served and which they have continued to serve despite the abolition of Pittsburgh as a sole basing point.

Although there was no special reference in the hearings to the Pittsburgh Plus method of quoting, it is rather generally accepted as having been primarily responsible for the indifference on the part of Pittsburgh producers in former years to rate discriminations. With Pittsburgh as a sole basing point in theory, and in fact on a good many products, substantially the same delivered prices were quoted from all producing centers and less of a burden was imposed on Pittsburgh, Wheeling, Youngstown and Cleveland, which account for most of the steel production of the country and have almost equal rates east or west, than under the new order of multiple basing points.

## Rehabilitating Shop Equipment

The Monarch Machine Tool Co., Sidney, Ohio, suggests to THE IRON AGE that if machine tool builders would give publicity to their purchases of machine tools and other equipment for their own shops, it would stimulate other users of machine tools to give more thought to the replacing of obsolete equipment. With this in mind, the Monarch Machine Tool Co. supplies the information that it has added to its equipment within the past 30 days the following new tools:

One 3-L Gisholt turret lathe, one No. 4 Cincinnati vertical milling machine, one 2-M Cincinnati universal tool room milling machine, one 48-in. Cincinnati automatic milling machine with automatic clutching fixture, one No. 3 Kempf horizontal milling machine, one 3-L La Point hydraulic broaching machine, one 3-ft. Carlton radial drill, one 4-ft. Cincinnati Bickford Super-Service radial drill, one 12 x 72-in. Cincinnati grinder, one No. 2 Cincinnati centerless grinder, one 6 x 72-in. Whiton double-end centering machine, one 9 x 9-in. Peerless saw, one 4 x 34-in. Jones & Lamson flat turret lathe, one single spindle Allen drilling machine, one two-spindle Allen drilling machine, one Rockford Rigidmil, one hydraulic internal grinder; all machines arranged for individual motor drive.

In the same mail came a letter from the Taft-Peirce Mfg. Co., Woonsocket, R. I., advising that it has installed the following new equipment:

One type H Westinghouse electric hardening furnace, with full automatic temperature control, internal dimension 13 x 26 x 13 in.; one American Metallurgical Corporation electric lead pot, pot size 10 x 18 in., with full automatic temperature control; one Norton 36-in. high-speed surface grinder, Heald Sizematic internal grinder, Taft-Peirce thread grinding machine and Paragon high-speed blueprinting machine.

In addition to the above equipment, the Taft-Peirce company has also purchased instruments and has inaugurated a method of controlling the salinity of its brine quench within close limits at the most effective point from the saturation, and has also installed certain heated quenching baths in order to reduce and in a large measure eliminate breakage in the hardening of pieces of complex and irregular shape. The tool hardening room has been considerably rearranged; wall drawing baths have been installed, and in other ways the company's equipment and methods have been modernized.

## Huge Coal Stocks Available

Best estimates available give the potential capacity of non-union mines at approximately 10,000,000 tons per week, according to a bulletin issued by the Coal Bureau of the Chamber of Commerce of the United States. Against this weekly productive capacity, the average weekly consumption of bituminous coal for the six months period beginning April 1, based upon average weekly figures for the past five years, will be approximately 9,250,000 tons.

Reserve stocks of coal on hand April 1 are estimated at between 70,000,000 and 75,000,000 tons, a total higher than any previous figure. To the estimated stocks should be added coal in transit, usually estimated at two-weeks' production—probably between 20,000,000 and 25,000,000 tons—which gives a total of between 90,000,000 and 100,000,000 tons.

"In considering these figures," the report adds, "the coal user should bear in mind that they are for the country as a whole, and that in practice coal is not evenly divided among different parts of the country, nor among different classes of consumers."

## Pig Iron Production in 1926 Was 39,372,729 Tons

OFFICIAL figures of the American Iron & Steel Institute, just released, place the total production of pig iron and ferroalloys in 1926 at 39,372,729 gross tons. This includes 38,698,417 tons of pig iron and 674,312 tons of ferroalloys, including alloys made in blast furnaces and in electric furnaces. Significant figures are shown in the tables below, with comparisons with preceding years.

### PRODUCTION OF PIG IRON AND FERRO-ALLOYS BY STATES, 1922-1926.

States.	1922.	1923.	1924.	1925.	1926.
Maine, Mass., Conn.	1,084	1,309			2,729,261
New York, New Jersey	1,772,325	2,951,810	2,013,673	2,187,733	
Pennsylvania	9,731,788	14,804,620	11,068,979	12,523,485	13,587,881
Maryland	366,967	529,606	558,420	705,377	805,373
Virginia	49,024	276,874	97,739	125,325	103,000
Alabama	2,230,619	2,797,190	2,773,825	2,836,023	2,953,294
West Va., Kentucky	460,311	702,454	568,031	651,983	516,094
Tennessee	123,907	250,982	137,991	110,232	110,146
Ohio	6,484,162	9,347,960	7,415,039	8,862,646	9,359,275
Illinois	2,625,244	3,839,063	2,600,864	3,604,255	3,659,974
Indiana, Michigan	2,726,727	3,813,125	3,350,385	4,119,811	4,377,068
Wisconsin, Minnesota	381,030	724,717	357,271	468,479	537,499
Mo., Iowa, Colo., Utah, Washington	266,716	321,436	463,573	505,217	633,864
Total... Gross tons	27,219,904	40,361,146	31,405,790	36,700,566	39,372,729
Pig iron	26,825,060	39,721,415	30,874,765	36,116,311	38,698,417
Ferro-alloys	394,844	639,731	531,025	584,255	674,312

### PRODUCTION OF PIG IRON BY STATES, 1925-1926, SHOWING INCREASE OR DECREASE BY STATES.

States.	Production—Gross tons.					
	1926.	Per cent.	1925.	Per cent.	Increase	Per cent.
Pig iron:						
Pennsylvania	13,231,890	34.19	12,239,776	33.89	992,114	8.11
Ohio	9,261,405	23.93	8,767,772	24.28	493,633	5.63
Indiana, Michigan	4,377,068	11.31	4,119,811	11.41	257,257	6.24
Illinois	3,656,688	9.45	3,604,255	9.98	52,433	1.45
Alabama	2,933,796	7.58	2,815,688	7.80	118,108	4.19
Mass., New York	2,599,517	6.72	2,070,854	5.73	528,663	25.53
Maryland	796,964	2.06	685,662	1.90	111,302	16.23
Colorado, Utah	608,834	1.57	484,420	1.34	124,414	25.68
Wisconsin, Minnesota	537,499	1.39	468,479	1.30	69,020	14.73
West Va., Kentucky	513,994	1.33	650,483	1.80	*136,488	*20.98
Tennessee	96,165	.25	95,530	.26	635	.06
Virginia	84,597	.22	113,581	.31	*28,984	*25.52
Total pig iron	38,698,417	100.00	36,116,311	100.00	2,582,106	7.15

\* Decrease.

### PRODUCTION OF COLD AND HOT AND WARM BLAST CHARCOAL PIG IRON, 1922-1926.

Kinds of pig iron.	1922.	1923.	1924.	1925.	1926.
Cold blast				1,014	400
Hot and warm blast	224,731	251,177	212,710	195,150	163,480

Total... Gross tons. 224,731 251,177 212,710 196,164 163,480

### HALF-YEARLY PRODUCTION OF PIG IRON AND FERRO-ALLOYS ACCORDING TO FUEL USED.

States.	Blast furnaces. (a)			Production of pig iron not including ferro-alloys—Gross tons.		
	In blast June 30, 1926.	December 31, 1926.		First half of 1926.	Second half of 1926.	Total 1926.
		In.	Out.			
Coke pig iron	208	191	151	1,342	19,602,376	18,932,161
Charcoal pig iron	5	8	8	16	77,361	86,519
Total pig iron	213	199	159	358	19,679,737	19,018,680
Total ferro-alloys	11	11	10	21	† 336,345	† 337,967
Grand total	224	210	169	379	20,016,082	19,356,647

<sup>a</sup> Includes 1 idle anthracite coal and coke furnace.

During 1926 there were 21 blast furnaces in operation making ferro-alloys only or ferro-alloys and pig iron.

Blast furnaces only; electric furnaces not included.

### PRODUCTION OF PIG IRON BY GRADES AND FERRO-ALLOYS BY KINDS, 1925-1926, SHOWING INCREASE OR DECREASE.

Grades of pig iron and kinds of ferro-alloys.	1926.	Per cent.	1925.	Per cent.	Increase.	Per cent.
Pig iron:						
Basic	21,168,407	54.70	19,667,380	54.46	1,501,027	7.03
Bessemer and low-phos.	10,042,324	25.98	9,419,461	26.08	623,863	6.01
Foundry	5,506,968	14.23	5,183,745	14.35	323,223	6.24
Malleable	1,681,897	4.35	1,553,636	4.30	128,261	8.26
Forge	216,277	.56	240,652	.67	*24,375	*10.13
All other pig iron	82,544	.21	51,437	.14	31,107	60.48
Total pig iron	38,698,417	100.00	36,116,311	100.00	2,582,106	7.15
Ferro-alloys:						
Ferro-manganese	318,891	47.29	260,029	44.51	58,862	22.04
Spiegeleisen	76,215	11.30	65,755	11.25	10,460	15.91
Ferro-silicon	245,605	36.43	226,472	38.76	19,133	8.45
All other ferro-alloys	33,601	4.98	31,999	5.48	1,602	5.01
Total ferro-alloys	674,312	100.00	584,255	100.00	90,067	15.41
Grand total	39,372,729		36,700,566		2,672,163	7.28

\* Decrease.

### PIG IRON MADE FOR SALE BY GRADES IN 1926.

Grades.	Basic.	Bess. & low-phos.	Foundry.	Malleable.	Forge.	All other pig iron.	Total Gross tons.
Mass., N. York, Maryland	191,345	153,474	879,760	222,105	2,770		1,449,454
Va., W. Va., Ala., Tenn.	557,349	321,206	892,285	122,734	5,235		1,898,809
Ohio	71,485	12,262	1,455,541			23,058	1,718
Ind., Ill., Mich., Wis., Minn., Colo., Utah	845,677	13,405	850,485	442,723	7,845	5,276	2,165,411
Mich., Wis., Minn., Colo., Utah	439,317	29,582	419,089	443,281		18,057	1,349,926
Total pig iron	2,105,173	532,932	5,030,883	1,545,620	45,100	28,741	9,288,449

### METHODS BY WHICH PIG IRON AND FERRO-ALLOYS WERE CAST OR DELIVERED IN 1926.

States.	Molten condition.	Sand cast.	Machine cast.	Chill cast.	Direct castings.	Total Gross tons.
Mass., New York, New Jersey, Md.	1,655,180	155,484	1,701,113	22,254	603	3,534,634
Pennsylvania	10,062,970	155,649	3,006,723	266,708	3,831	13,587,881
Virginia, West Va., Ala., Ky., Tenn.	1,628,902	1,256,937	514,302	272,108	10,285	3,682,534
Ohio	5,642,881	97,870	3,600,099		12,425	9,350,275
Ind., Ill., Mich., Wis., Minn., Iowa, Colo., Utah	6,253,618	145,536	2,801,282	67	7,902	9,208,405
Total	25,343,551	1,811,476	11,721,519	561,137	35,046	30,372,729

### PIG IRON AND FERRO-ALLOYS MADE FOR SALE OR FOR USE OF MAKERS IN 1926.

Pig iron and ferro-alloys.	For sale.	For maker's use.	Total Gross tons.
Pig iron:			
Basic	2,105,173	19,063,234	21,168,407
Bessemer and low-phosphorus	532,932	9,509,392	10,042,324
Foundry	5,030,883	476,085	5,506,968
Malleable	1,545,620	136,277	1,681,897
Forge or mill	45,100	171,177	216,277
White and mottled, direct castings, etc.	28,741	53,803	82,544
Total pig iron	9,288,449	20,400,968	38,698,417
Ferro-alloys:			
Ferro-manganese	120,466	198,405	318,891
Spiegeleisen	75,730	485	76,215
Ferro-silicon	242,386	3,219	245,605
All other ferro-alloys	33,209	392	63,601
Total ferro-alloys	471,811	202,501	674,312
Total pig iron and ferro-alloys	9,760,260	29,612,460	39,372,729

ESTABLISHED 1855

# THE IRON AGE

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## Steel Corporation Active Capacity

FREQUENTLY THE IRON AGE is asked by a reader why the Steel Corporation's operating percentage, expressed in terms of active ingot capacity, is uniformly larger than that of the independent producers of steel. More attention has been given to the matter this month, in view of published statements that the Steel Corporation's steel ingot output has been running within 2 or 3 per cent of rated capacity.

A complete answer to the question would need to cover a good deal of ground. One of the first and most obvious explanations is that the Steel Corporation has a greater variety of products than any other company and thus is less affected than some of its competitors by variations in demand in particular lines. A few large independents have nearly as great a range in the main tonnage products as the Steel Corporation, but on the other hand a score or more of smaller independents have but one or two major products, so that any slackness in those lines would pull down the independent average.

A second factor involves the basis of capacity ratings for the steel plants of the Steel Corporation and those of independent companies. There have been indications that the Steel Corporation's rating of its steel ingot capacity is nearer to its actual maximum performance than has been the case with some of the independents. Thus in 1917, the year of the country's maximum war output, the corporation produced 20,285,000 tons of ingots, or 91.4 per cent of its capacity rating of 22,200,000 tons. Yet the entire steel industry with a rated capacity (American Iron and Steel Institute) of 52,541,000 tons of ingots, had an average operation of 83 per cent for the year, with an output of 43,619,200 tons, indicating that the independent companies produced at only 75 per cent. A difference of 16 per cent between Steel Corporation and independent operations in a year of full and imperative demand is a manifest error.

When it was formed, the Steel Corporation had fully 75 per cent of the Bessemer capacity of the country. Much of this has been eliminated, and outside of Gary, Duluth and the Birmingham dis-

trict, the corporation's activities in building ingot capacity have been to no small extent, and more particularly in recent years, as its annual report for 1926 put it, to "replace old, obsolete and high-cost plant and units, and to establish equipment and facilities at modern and efficient standards to insure economical operation." Along with this replacement policy there has evidently been a very conservative rating of the corporation's ingot capacity, as shown by the fact that on Dec. 31, 1916, it was 22,000,000 tons, while on Dec. 31, 1926, it was 23,176,900 tons, an increase in ten years of but 1,176,900 tons. In the same period the independent steel companies reported additions of 4,244,000 tons.

Another factor in operating percentages is steel exports. The Steel Corporation last year shipped abroad 1,327,052 tons of rolled and finished steel products out of a total of 1,953,000 tons. Independent steel companies thus have but 32 per cent of the export total of rolled steel.

The wider distribution of the Steel Corporation's plants should also figure in any estimate of its activities in production. Chicago operating percentages are perennially high—an index to the large-scale railroad consumption in tributary districts. The corporation's Alabama mills in recent years have had a full operation for the most part, on Southern and export trade.

Some minor considerations might be added to the above, but they could not be adequately stated except by the Steel Corporation itself.

GERMANY made a noteworthy recovery in her iron and steel exports in 1926. Final data show a total of 4,824,000 gross tons, or 402,000 tons per month, with scrap not included. This was 50 per cent larger than the 267,600 tons per month in 1925 and compares with 517,300 tons per month in 1913, when Luxemburg's portion was included. Germany last year recovered her pre-war position as the leading exporting nation. While Great Britain's inability to take her share of world trade during the coal strike contributed to Germany's success, it is also true that German steel makers

have been and still are aggressive in this field. Less than 12 per cent of the German total was pig iron and ferroalloys, and all forms of finished steel were pushed aggressively. Moreover, all the indications are that every country that exports steel will find Germany its most active competitor in 1927.

### Europe Buys American Crankshafts

EUROPEAN automobile builders have placed initial orders for crankshafts in the United States. Apart from some of the high-priced cars they have stuck closely to the four-cylinder type, a chief reason being the lower fuel cost. Now there is a persistent demand for six-cylinder cars of medium price, and the manufacturers are preparing to meet it. The problem of the crankshaft is particularly difficult. Continental automobile works are making very satisfactory four-throw crankshafts, but the six-throw shaft is a very different matter, having a technique of its own. In the past some of the European makers of expensive cars have even gone so far as to machine the shafts from solid forgings, with no preliminary forming under the hammer, a procedure which of course is costly, and from the standpoint of American practice otherwise unsatisfactory.

The European manufacturers who now have the problem before them have been frank in their statements to visiting American technicians that it will take a long time for them to acquire the knowledge which forge shops here have mastered through years of research and practice. One initial order is from a great Italian works, which has found it expedient, at any rate in its early models of six-cylinder cars, to depend upon the American product, in spite of high import duties and freight charges.

### New England's Industrial Trend

FINDING it necessary to curtail production, the American Woolen Co. recently closed seven plants in New England. They were small units, with a total of only 10 per cent of the looms of the company, but most of them were in little country towns, of which they were the major industry. The company was implored to keep them going, but was constrained to answer that they no longer paid.

No blame falls rightly upon the company for its decision. Nevertheless, such an event is tragedy to many workers. There are numerous decadent mill towns in Massachusetts where the men and women who used to spin and weave linger on, leading a precarious existence. They are partly the victims of circumstances and partly of their own ignorance and willfulness in obtaining in company with workers in other towns shorter hours by legislation, and higher wages by collusive demands, and so helping to strangle the industry out of which they earned their living.

Workers in making life miserable for their employers do not realize until too late that it is out of their industries that they themselves obtain their living; that wages can be paid only so long as they are earned. The mill and factory towns of New England, many of them at least,

are now waning owing to such absence of understanding and cooperation, which is the sadder in that it was just such teamwork that made them great in the first place. The mutual good feeling and helpfulness that budded in the old squad shoe shops blossomed in the early factories and decayed as they swelled in size.

There are earnest citizens who are advertising that New England is not yet dead, and, of course, it is a long way from being so, but whether it will return to what it was once is a matter of serious concern. Its working population is not so purely of the old stock and now in many centers has unsound ideas. Education at home will be more important than advertising abroad. There will be need for the several legislatures to give attention to the hampering laws that they have wrapped around their industries at the behest of short-sighted labor leaders, also to the great weight of the taxation they have imposed.

### Wealth and Popular Taste

THE National Industrial Conference Board estimates that the national wealth of the United States in 1925 amounted to \$355.3 billion, and compares this with the census estimate for 1912, which was \$186.3 billion. We assume that the conference board endeavors to follow the same rules as the census in considering what is wealth and appraising its amount.

Reducing the figures to terms of 1913 dollars, the conference board makes the 1912 wealth \$188 billion and the 1925 wealth \$223.9 billion, thus showing an increase of 19 per cent. The conference board having indorsed this 19 per cent finding, one is at liberty to analyze and draw such conclusions as are justifiable if it is correct.

Population of the United States was approximately 95,000,000 in 1912 and 115,000,000 in 1925, thus showing an increase of 21 per cent. With an increase of 19 per cent in wealth, measured in standard dollars, the per capita wealth has slightly decreased. A complete lack of progress is indicated, whereas with all our improvements in getting things done, and with the admitted "prosperity" of the people, very substantial progress should be indicated. Furthermore, if we merely broke even in our individual efforts to increase wealth there should be a substantial increase in the total wealth through enhancement in land values. The mere fact of there being more people in the country to occupy the land would make the land more valuable.

Thus the finding shows that we have gone backward in the matter of creating physical wealth by our work. If the wealth figures upon which the 19 per cent increase in 13 years is based are erroneous, by 1912 being set too high or 1925 being set too low, still any error that can reasonably be imagined leaves it that our per capita accumulation of material things produced by our efforts, excluding "unearned increment" in land values, is not what one would expect from the previous progress of the people.

Support is thus furnished for the view that the popular taste has changed. There is not the disposition to accumulate material things by thrift that there once was. Many will rail against the popular taste, but railing does no good. It is bet-

ter to adjust one's attitude to the plainly disclosed circumstances.

We are not lightly to dismiss the figures by an assumption that they are egregiously wrong. We have made much progress in developing things that minister to our comfort and happiness, and the people may be much better off even if their belongings do not exhibit an improvement when measured by the dollar standard. A "flivver" may be valued in current dollars or 1913 dollars or other dollars at much less, in appraising wealth, than a horse and buggy 20 years ago, or a limousine than a coach and four; but which gives the greater pleasure and involves the less work in maintenance? Or put a \$100 radio set against what \$100 would buy for one's entertainment 20 years ago, or electric comforts in the home against what the same outlay would buy in the past. We may be much better off without having more dollar value as dollars go.

### High-Test Cast Iron

ATTEMPTS were made not so long ago to induce makers and users of "semi-steel" castings to adopt the term "high-test cast iron" for this product. There was some response to the effort, but it was to be expected that the commercial practice which defines semi-steel as gray iron produced from a charge containing 30 per cent or more of steel scrap would not be readily displaced.

In recent years alloys added to gray iron mixtures, whether in the cupola or the electric furnace, have resulted in products of superior strength, containing nickel, chromium or other metals. The Mayari irons come into this category. Also duplexing with the electric furnace and the cupola has made a product of increased strength. Then there are the pearlitic irons, also the process recently brought forward in Germany by Piwowarsky, by which cupola iron heated to very high temperatures gives castings of unusual properties.

Under the standard specifications of the American Society for Testing Materials, high-test gray iron covers "all classes of gray iron castings which are required to have a high tensile strength, including those generally known as semi-steel castings." At the meeting of the sub-committee on high-test iron, held in Philadelphia two weeks ago, the opinion prevailed that in view of the metallurgical developments referred to above an increase in the minimum tensile strength and the minimum transverse load of the specifications is necessary. While such a change furnishes one measure of progress in the gray iron field, it at the same time suggests that the designation "high test" calls for more clarification than has been possible thus far.

### Remarkable Exports of Tin Plate

TIN plate exports from the United States, as pointed out in this department last week, are breaking all records. February shipments of 28,776 tons brought the eight-months' total to 223,086 tons, or an average of roundly 28,000 tons per month. In January and February together no less than 70,650 tons was shipped out.

It happens that the present remarkable movement, in part a result of the British coal strike, began with last September. With 26,608 tons going out that month, or more than in any month since

January, 1921, each subsequent month has shown a gain, except for February. The September-February total of the heavy shipments is 185,059 tons, or a monthly average of 30,843 tons. Only two months in our previous history (May, 1918, with 37,350 tons, and January, 1921, with 34,545 tons) have surpassed this average.

Wartime exports of tin plate began to assume large proportions in July, 1915. In that year a new high record was made at 154,561 tons. As recently as 1909 the total had been 9327 tons only. In 1916 the exports reached 227,348 tons, a record destined to stand until 1926, though closely approached by 1918, with 222,448 tons, and 1920, with 226,410 tons.

A brief survey of our imports of tin plate reveals that the average for nine years ended with 1910 was 60,705 tons annually, much of it drawback plate. And the tonnage was fairly uniform over that period, the smallest year (1903) being only 34 per cent below the largest (1904). From 1911 to date, however, after domestic manufacturers began displacing Welsh drawback plate, only one year has reached importations of 16,000 tons (1913, with 20,680 tons) and six years have dropped, individually, below 1000 tons. The total for 16 years, 73,158 tons, was only 3½ per cent above that for the single year 1904.

The American tin plate industry "found itself" about 1910, so far as export markets on the one hand and the control of imports on the other were concerned. Not since 1910 have imports even approached the total of exports. How far the present high rate of exports can be maintained, in face of the renewal of Welsh competition in overseas markets, remains to be seen.

### Sound Machine Tool Advice

IN a paper on "Recent Developments in Machine Tool Design," presented by G. E. Bailey and Thomas Smith to the Manchester Association of Engineers, the authors summarize the important elements in efficient production, aiming to drive home a lesson to British owners who have not yet awakened to present-day requirements of successful competition. Nor is the United States lacking in users of machine tools who would profit greatly by accepting the following maxims:

A closer study of the true cost of manufacturing, prepared by qualified cost men and works accountants in order to show high spots which on further investigation will emphasize the necessity for improved equipment and methods.

A freer opportunity for machine tool makers to review the manufacturers' plants.

A more responsible attitude on the part of machine tool makers and a backing up of their suggestions for substituting modern for obsolete machines by guaranteed performances and clear statements of savings to be made and advantages to be gained.

Such statements should include savings effected by reduced floor-to-floor times; reduced setting up and floor construction charges; reduced overhead charges; replacement of skilled operations by mechanical means; more accurate machining resulting in reduced cost in the fitting and assembly shops, and reduction in capital investment owing to jobs being a shorter time in the shops and capital being turned over more often.

## STRIKE EFFECTS UNCERTAIN

### Coal Situation Still in Doubt—Pittsburgh Producers Ignore Miners' Latest Proposal

PITTSBURGH, March 29.—Little attention is paid to the proposal of the United Mine Workers of America by Pittsburgh district coal producers, who have been operating under an agreement with that organization, that the mines be kept running after the termination of the existing agreement on Thursday, with the Jacksonville scale to prevail pending a definite settlement.

Acceptance of the proposal by western Pennsylvania operators is unlikely, nor is it believed that producers in Ohio, Indiana, or Illinois, which constitute with western Pennsylvania the so-called Central competitive field, will be swayed from their determination to treat with the union only when it has a definite plan that recognizes that the union mines must be able to operate in competition with the non-union mines. No such proposal has been made by the miners' union, and operators in this district are going ahead with their plans either to suspend operations on March 31, or to continue in production and go upon an open shop basis.

The Pittsburgh Coal Co. two years ago broke away from the union and, after a few months' complete shutdown, resumed operations at a number of its mines on an open shop basis. Another large commercial coal company, which has been operating under an agreement with the union, will start up on April 1 without any agreement with the union. In the West and in central Pennsylvania, the operators have accepted the union proposal to keep running, but the scales for all districts in the past have been based upon the settlement covering the Central competitive field and the union mines outside of that area do not count heavily in the nation's coal supply.

The prevailing opinion is that the strike will come on Friday and, that while there will be less defection among men in the non-union districts than in the last previous strike in 1922, there will be defections and that production will suffer from the activities of the union organizers, many of whom already are in the non-union districts. In the Connellsville district, the operators already are preparing for trouble. They are taking no chances in employing new men and are ascertaining that those who apply for work have no affiliations that later would mean loss of production.

In a general way, what happens in the non-union fields will have considerable bearing on the outcome of the strike. It is generally admitted that the union leaders recognize the necessity of curtailing non-union production if they are to make progress in retaining their hold on the present union districts and consequently union activity is expected to be strong in the non-union fields. Not much concern is felt about supplies of coal or its cost during April, because there is such a heavy stock, but if the strike should last through that month and should extend to Connellsville, West Virginia and Kentucky, making necessary heavy withdrawals from the stocks, a revision of ideas would be necessary.

### Finding Is Against Complaint Based on Jones & Laughlin Scale

WASHINGTON, March 29.—The fifth class rate of 23.5c. per 100 lb. on finished iron and steel products in carloads from Gary and Indiana Harbor, Ind., to Holland, Mich., is not unreasonable or unduly prejudicial, according to a proposed report made last week to the Interstate Commerce Commission by Examiner Horace W. Johnson, who recommended dismissal of the complaint against this rate made by the Holland Furnace Co., Holland, Mich. Among other points made by the complainant was that in the Jones & Laughlin case the commission found the fifth class rate from the Pittsburgh district to St. Louis and points in Illinois and Indiana unreasonable and fixed a maximum distance scale with a rate of 17.5c. for 140 to 150 miles and 18c. for 150 to 160 miles. The distance from Chicago to Holland is 159 miles.

The railroads pointed out that if the Jones & Laugh-

lin scale is compared with the fifth class rates for similar distances, although for short distances the former is lower, it eventually crosses and exceeds the fifth class rates. They also said that if the rates on all iron and steel articles in their territory were reduced to a level approximating the Jones & Laughlin scale it would result in a loss of revenue to the Pere Marquette Railway, which serves Holland, of \$300,000 to \$400,000 a year. They further explained that the Pere Marquette was not a defendant in the Jones & Laughlin case and contended that that scale was not applicable to traffic conditions existing in Michigan.

### Papers for Manganese Meeting at Cleveland April 19 and 20

A large representation of steel works and blast furnace operating men and of mining engineers is expected at Cleveland on April 19 and 20 at the meeting under the auspices of the American Institute of Mining and Metallurgical Engineers, Ohio section, to discuss ways and means of providing adequate supplies of manganese ore for the protection of the American steel industry. The Secretary of War will attend and officials connected with the United States Geological Survey and Bureau of Mines.

The sessions will be held at the Hotel Cleveland. Two are scheduled for Tuesday, the first day; one to discuss ore problems, presided over by C. K. Leith; the other, the problems of metallurgy, J. V. W. Reynolds presiding. The second day will be taken up with committee meetings and visits to schools and industrial plants. The list of papers follows:

Some Political Aspects of the World Manganese Situation. By C. K. Leith, University of Wisconsin, Madison, Wis.

Manganese Resources in Relation to Domestic Consumption. By J. V. W. Reynolds, consulting engineer, New York.

Manganese Deposits of the Gold Coast, Africa. By Sir Arthur E. Kitson, Director of the Geological Survey of the Gold Coast, London. With Notes on the Petrology of Certain Associated Manganese Silicate-bearing Rocks, by Maj. N. R. Junner.

Reserves of Lake Superior Manganese Iron Ores. By Carl Zappfe, manager iron ore properties, Northern Pacific Railway Co., Brainerd, Minn.

Iron Manganese Alloys Low in Carbon. By Sir Robert Hadfield, Hadfields, Ltd., London.

Manganese in Non-ferrous Alloys. By M. G. Corson, consulting engineer, New York.

Importance of Manganese in the Steel Industry. By H. M. Boylston, Case School of Applied Science, Cleveland.

Minnesota Manganese Iron Ore in Relation to the Iron and Steel Industry. By T. L. Joseph, E. P. Barnett and C. E. Wood of the North Central Mining Experiment Station, United States Bureau of Mines, Minneapolis.

Communications relative to the meeting and hotel accommodations may be addressed to C. B. Murray, Crowell & Murray, Perry-Payne Building, Cleveland, secretary Ohio Section, American Institute of Mining and Metallurgical Engineers.

### Canadian Output Fell Off in February

TORONTO, ONT., March 29.—Production of pig iron in Canada during February amounted to 50,695 gross tons, a decline of 2 per cent from the output of 51,717 tons in January, but a slight increase over the output in February a year ago. For the two months ended with February the production was 102,412 tons or about 4000 tons below the output in the first two months of last year. Five furnaces were in blast at the end of the month. A second furnace, however, was blown in at Sault Ste. Marie early in March.

The production of steel ingots and castings during February was 55,620 tons, a decline of 5 per cent from the 58,551 tons of January but it was 5 per cent greater than the 53,157 tons reported for February, 1926. For the first two months of this year, the total production was 114,171 tons or a decline of 6 per cent from the 121,693 tons reported for the corresponding two months of last year.

# Iron and Steel Markets

## Demand and Production Sustained

Industry Begins April with the Expanded March Operations—Will Events Determine Effect of Coal Developments—Higher Basic Pig Iron

MARCH goes out with steel operations considerably higher than when it came in, and there are no present signs of a subsidence in either demand or production.

Numbers of the independent steel companies, not rolling rails, on which shipments are being completed, find the volume of their unfilled orders substantially equal to those at the end of February.

Shipments of the first quarter are not much under those of a year ago, while the orders, individually smaller, numerically top those of the corresponding period last year.

Price irregularities continue in practically all the major lines of steel, in spite of the large sum total of demand. The keen competition among fabricators of structural steel is reflected now and then in concessions on the plain material. Deviations in sheets appear less numerous, however, and black sheets are more difficult to obtain below 2.80c., Pittsburgh, except occasionally in the heavier gages.

The Gary works of the Steel Corporation are running full, the twelfth and last blast furnace being blown in this week. In the Chicago district 30 of the 36 steel plant stacks are active. Ingot output at Pittsburgh is on a 90 per cent rate, and at Youngstown close to 85 per cent.

Consumption continues relatively the heaviest in Chicago, where sales reported for the week are the largest so far this year by a wide margin. There has been some measure of second quarter buying, but in the main the orders do not cover more than 60-day requirements. The willingness to go beyond the 30 days' commitments, hitherto widely ruling, is not regarded as reflecting concern over a coal strike, but a proportioning of needs to orders in hand.

Opinion of the soft coal strike is that some mines will shut down on Friday while others will continue in production on an open-shop basis. The heavy stocks of coal leave plenty of time to appraise the effect of what happens after April 1. Meanwhile coal business has actually grown smaller and the supply of furnace coke is so large that prices might show weakness if pig iron producers were not well covered.

Basic pig iron in the Valley has advanced to \$19, furnace, on a sale of 7500 tons. This is the second advance of 50c. a ton since the middle of March. With the waning of buying movements in the Cleveland district and in the East, the pig iron market is showing more activity in other sections. In Alabama the recent announcement of second quarter prices has been followed by generous buying. One seller is already comfortably booked for the coming quarter, having taken orders totaling 42,000 tons. At Chicago contract-

ing for second quarter has been heavier than for any three-month period except one in the last three years, and the blowing in of another merchant furnace is contemplated. Demand is also active in Michigan, where the automotive industry is melting a large amount of iron and is specifying heavily for April delivery. Sales of silvery iron, totaling 3500 tons, are a feature of the Cincinnati market.

Scrap is stronger at Chicago, following a large purchase of heavy melting steel by a steel company that had been out of the market for two years.

A survey of the outlook indicates that steel building activity is well up to where it was a year ago. Steel that has been required for rails will now be available for car material, of which there is renewed promise of buying, with fresh inquiries appearing this week. Automobile manufacturing is proceeding at a high rate, save in the case of two large Detroit motor car builders. The oil industry is still in need of large tonnages of plates for oil storage tanks. Agricultural implement makers are taking more steel than was expected, while early spring has brought some improvement in wire and wire products. The canning situation now points to a transfer from the can makers to the packers of any financing of the farmers and expectations are that all the tin plate ordered for the purpose will be taken. In all this, the coal strike has not figured as a lever.

An inquiry from the New York Central for 3500 freight cars is expected to mean the buying of double the number. The Pere Marquette is out for 1500 freight cars, a tank car line for 250 to 500 cars, and a coal company for 1150 mine cars. The Boston & Maine is asking bids on 35 locomotives, the Reading on 25 and the Kansas City, Mexico & Orient on 15.

Structural steel awards of about 33,000 tons in the week included 10,000 tons for an office building in Detroit and 5500 tons for one in New York. Inquiries totaling close to 50,000 tons are made up largely of several sizable projects, such as 12,000 tons for coal barges for a Pittsburgh company, 9000 tons for New York subway work, 4500 to 5000 tons for oil tanks in California and 4200 tons for a theater and office building in Toledo.

The new rivet price list makes Cleveland a basing point for large rivets. Consumers are releasing good specifications against first quarter contracts on large bolts, on which the new list effective April 1 calls for advances of 3 to 5 per cent, but they are withholding them on the small sizes, which will be lower after April 1.

Imports of iron and steel in February, 49,460 tons, were the smallest monthly total since November, 1924.

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics  
At Date, One Week, One Month, and One Year Previous

Mar. 29,		Mar. 22,		Mar. 1,		Mar. 30,	
1927		1927		1927		1926	
Pig Iron, Per Gross Ton:							
No. 2, fdy., Philadelphia	\$21.76	\$21.76	\$21.76	\$21.76	\$22.76		
No. 2, Valley furnace	18.50	18.50	18.50	20.50			
No. 2, Southern, Cin'ti.	21.69	21.69	21.69	25.69			
No. 2, Birmingham	18.00	18.00	18.00	22.00			
No. 2 foundry, Chicago*	20.00	20.00	20.00	23.00			
Basic, del'd eastern Pa.	20.75	20.75	21.00	21.75			
Basic, Valley furnace	<b>19.00</b>	18.50	18.00	20.00			
Valley Bessemer, del. P'gh	21.26	21.26	20.76	22.76			
Malleable, Chicago*	20.00	20.00	20.00	23.00			
Malleable, Valley	18.50	18.50	18.50	20.50			
Gray forge, Pittsburgh	19.76	19.76	19.76	21.76			
L. S. charcoal, Chicago	27.04	27.04	27.04	29.04			
Ferromanganese, furnace	100.00	100.00	100.00	88.00			

### Rails, Billets, etc., Per Gross Ton:

	Mar. 29,	Mar. 22,	Mar. 1,	Mar. 30,
	1927	1927	1927	1926
O-h. rails, heavy, at mill	\$43.00	\$43.00	\$43.00	\$43.00
Light rails at mill	36.00	36.00	36.00	34.00
Bess. billets, Pittsburgh	34.00	34.00	34.00	35.00
O-h. billets, Pittsburgh	34.00	34.00	34.00	35.00
O-h. sheet bars, P'gh	34.00	34.00	34.00	36.00
Forging billets, P'gh	40.00	40.00	40.00	40.00
O-h. billets, Phila.	39.30	39.30	38.30	40.30
Wire rods, Pittsburgh	43.00	43.00	43.00	45.00
Cents	Cents	Cents	Cents	
Skelp. grvd. steel, P'gh, lb.	1.90	1.90	1.90	1.90

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.22
Iron bars, Chicago	2.00	2.00	2.00	2.00
Steel bars, Pittsburgh	1.90	1.90	1.90	2.00
Steel bars, Chicago	2.00	2.00	2.00	2.10
Steel bars, New York	2.24	2.24	2.24	2.34
Tank plates, Pittsburgh	1.85	1.85	1.85	1.90
Tank plates, Chicago	2.00	2.00	2.00	2.10
Tank plates, New York	2.19	2.19	2.19	2.24
Beams, Pittsburgh	1.90	1.90	1.90	1.90
Beams, Chicago	2.00	2.00	2.00	2.10
Beams, New York	2.19	2.19	2.19	2.24
Steel hoops, Pittsburgh	2.30	2.30	2.30	2.50

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

## Pittsburgh

### Steel Output at 90 Per Cent—Fuel Market Unaffected by Impending Strike— Basic Iron Up 50c.

PITTSBURGH, March 29.—It may prove that March this year as in other recent years will be the peak month of steel production and business, but at the close of the month there is no evidence of a subsidence either of demand or of plant operations. Possibly present activity, which is partly explained by the fact that there is a little extra buying as a precaution against the possibilities of the impending coal strike, will mean a corresponding recession later when these extra purchases come to be liquidated, but the common report is that business is good and this district closes the month with ingot production at close to 90 per cent of capacity.

Prices have not changed materially in the past week, but the apprehension concerning the coal strike is extending to the manufacturers and in some products there is little desire for business calling for delivery beyond April. A stronger tendency is noted in sheets, and mills in this district now do not find it necessary to go under 2.80c. to get orders for black sheets.

Orders for finished steel still show irregularity. Oil well pipe is slow, but the oil and gas industry is partially making up for light buying in that direction in heavy purchases of tankage and line pipe. Business in plates is good, because of tankage and large pipe requirements, as well as demand for river barges.

Sheets, Nails and Wire,		Mar. 29,		Mar. 22,		Mar. 1,		Mar. 30,	
Per Lb. to Large Buyers:		1927		1927		1927		1926	
Sheets, black, No. 24, P'gh	2.75		2.75		2.75		2.75		3.10
Sheets, black, No. 24, Chi-									
cago dist. mill.									
Sheets, galv., No. 24, P'gh	2.65		2.65		2.65		2.65		4.05
Sheets, galv., No. 24, Chi-									
cago dist. mill.									
Sheets, blue, 9 & 10, P'gh	2.20		2.20		2.20		2.20		2.50
Sheets, blue, 9 & 10, Chi-									
cago dist. mill.									
Wire nails, Pittsburgh	2.55		2.55		2.55		2.55		2.65
Wire nails, Chicago dist.									
mill									
Plain wire, Pittsburgh	2.40		2.40		2.40		2.40		2.50
Plain wire, Chicago dist.									
mill									
Barbed wire, galv., P'gh	3.25		3.25		3.25		3.25		3.35
Barbed wire, galv., Chi-									
cago dist. mill									
Tin plate, 100 lb. box, P'gh	\$5.50		\$5.50		\$5.50		\$5.50		

### Old Material, Per Gross Ton:

Carwheels, Chicago	\$15.00		\$15.00		\$15.00		\$17.00
Carwheels, Philadelphia	16.00		16.00		16.00		17.50
Heavy melting steel, P'gh	16.75		16.75		16.75		17.00
Heavy melting steel, Phila.	14.50		14.50		14.50		16.50
Heavy melting steel, Chi'go	<b>13.25</b>		13.00		12.75		14.00
No. 1 cast, Pittsburgh	16.00		16.00		15.75		17.00
No. 1 cast, Philadelphia	17.00		17.00		17.00		17.50
No. 1 cast, Chi'go (net ton)	16.50		16.50		16.50		17.00
No. 1 RR. wrot. Phila.	17.00		17.00		17.00		17.50
No. 1 RR. wrot. Chi'go (net)	<b>12.50</b>		12.00		12.00		13.00

### Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt	\$3.25		\$3.25		\$3.50		\$3.00
Foundry coke, prompt	4.25		4.25		4.50		4.25

### Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.37 1/2	13.50	13.50	14.12 1/2
Electrolytic copper, refinery	12.87 1/2	13.12 1/2	13.12 1/2	13.62 1/2
Zinc, St. Louis	6.52 1/2	6.65	6.82 1/2	7.10
Zinc, New York	6.87 1/2	7.00	7.17 1/2	7.45
Lead, St. Louis	7.10	7.30	7.32 1/2	8.00
Lead, New York	7.35	7.65	7.40	8.37 1/2
Tin (Straits), New York	68.00	69.25	69.62 1/2	62.87 1/2
Antimony (Asiatic), N. Y.	<b>14.00</b>	13.00	13.50	19.25

Sheet business is sufficient to bring mill operations to almost 90 per cent of capacity.

Viewing the situation from the angle of consuming industries, the building construction demand is well up to where it was a year ago; the automobile industry is producing at a high rate considering that two of the largest producers are not running at 50 per cent; the agricultural implement industry is taking a good deal of steel, but railroad demand is disappointing, even showing some recession in standard-section rail releases.

The close proximity of the coal strike has occasioned no excitement in the coal and coke market. Spot offerings of furnace coke are still too large for the demand, and prices are low and easy. Furnaces have covered generally for the second quarter at much more favorable prices than for the quarter now closing. The scrap market shows no activity, and its firmness is largely in sympathy with the outside markets. The interesting event of the week in pig iron was a sale of 7500 tons of basic iron at \$19, Valley furnace, an advance of 50c. a ton over last week's price. Other grades are unchanged.

**Pig Iron.**—Except for the sale of one big block of basic iron, the purchaser of which was a producer with a long-time requirement contract and whose furnace at present is out of blast, the week has been an extremely quiet one in the matter of sales. This basic sale was at \$19, Valley furnace, and must be regarded as the quotable price, since seemingly none of this grade was available at less. There is no basic iron in the hands of merchant producers, and while the steel companies have stocks, they seem disinclined to part with them until they see how the strike trends, especially in its effect upon non-union coal production.

Other grades remain at last week's prices. Small lots of Bessemer iron have sold at \$19.50, Valley furnace, and the sales of foundry and malleable grades also have been in small lots at the prices of a week ago.

*Prices per gross ton f.o.b. Valley furnace:*

Basic	\$19.00
Bessemer	19.50
Gray forge	\$18.00 to 18.50
No. 2 foundry	18.50 to 19.00
No. 3 foundry	18.00 to 18.50
Malleable	18.50 to 19.00
Low phosphorus, copper free	28.00

Freight rate to the Pittsburgh or Cleveland district, \$1.76.

**Ferroalloys.**—Contract buyers are specifying well for ferromanganese, spiegeleisen and 50 per cent or higher grade ferrosilicon, but new business is confined largely to the occasional carload lot buyer. Spot offerings of spiegeleisen are limited, but spot requirements in the other materials are easily supplied. Prices hold at recent levels.

**Semi-Finished Steel.**—Makers of sheets and strips who do not make their own steel are having a good operation and drawing steadily upon regular supply sources for billets, slabs and sheet bars. Open market business, however, amounts to little. All makers in this district are quoting sheet bars, and large billets and slabs at \$34, Pittsburgh or Youngstown, and 50c. to \$1 per ton more for small billets and slabs. No change is noted in wire rod or skelp prices, and on forging quality steel, \$40, base, Pittsburgh, is the quotation of local producers.

**Wire Products.**—Most producers report a livelier demand. This is due to the fact that jobbers and consumers have not this year, as formerly, anticipated their spring requirements, and they now find need of additional supplies as the spring demand from consumers develops. Evidently manufacturers were prepared for larger demands, and the increased movement from the mills has not been accompanied by any material increase in productive activities, which still range from 50 to 60 per cent of capacity. Prices here and in most markets north of the Mason and Dixon line are quite steady. Southern mills seem disposed to take their share of the burden imposed upon the South by the low prices of cotton and tobacco.

**Rails and Track Supplies.**—The movement of standard-section rails is not quite so heavy as it was during the early months of the year. Deliveries seem to have been sufficient to meet the spring track-laying programs of most roads, and one large system, which carries large quantities of coal, is reported to have cancelled its April quota, presumably because of a belief that the wear and tear on the rails will be less in event of a falling off in the movement of that commodity. There is only a moderate demand for light-section rails, and there is room for improvement in business in spikes and other track accessories. Prices are holding well.

**Tubular Goods.**—If it were not for large backlog in line pipe and the prospect for much more of this business, the story about tubular goods would be rather cheerless. Over-production of oil, with the attendant decline in prices to a level that is unprofitable for most producers, has told rather heavily on the demand for drill and drive pipe and casing, and while the call

for standard-weight pipe for building construction is picking up, it is still running light in comparison with other recent years at this season. The South, getting spring ahead of the remainder of the country, usually provides much standard pipe business at this time of the year. Low prices for its farm products of last year still are felt in the buying power of that section. Pipe prices are holding well because there is no undue pressure to sell. Boiler tubes are in fair demand, with prices no better or worse, from the producers' viewpoint, than they have been.

**Sheets.**—The market looks better from both the price and the business angle. Independent mills are running at more than 90 per cent of capacity, and the American Sheet & Tin Plate Co. last week had an engagement of 80 per cent of its sheet-making capacity, with all of its jobbing mills in production. The week before, the latter ran only 73 per cent of capacity, and the increase of the past week is significant, since this mill has not been meeting some of the low prices that have been current since the first of the year. Although formal second quarter contracts have not been numerous, sheet buyers generally are disposed to buy a little further ahead of their requirements than recently, evidently desiring some protection in the event that the coal strike is more serious than is commonly expected. Automobile body sheets are moving well, but not as well as they would with fuller production by two large makers of popular-priced cars. Black sheets no longer appear to be available at less than 2.80c., base Pittsburgh, and the market is a shade firmer on other finishes, although not notably higher.

**Tin Plate.**—Reports from the can industry indicate that more tin plate was cut up in the first two months of this year than in any similar period in the history of the industry. This has caused some revision of estimates as to probable first half requirements of the container manufacturers, especially as there is a possibility that the packers will be able to finance the packing crops without the help of the can companies. Recently it looked as if specifications against first half contracts for tin plate for packers' cans would fall from 5 to 10 per cent under original orders, but tin plate makers now expect the difference to be smaller than that. Mill operations average between 85 and 90 per cent of capacity engagement.

**Cold-Finished Steel Bars and Shafting.**—Automobile parts makers are taking out steel in good fashion, and shipments in March of local producers will come very close to equaling those of the same month last year, despite small purchases by two makers of popular-priced cars whose steel requirements are large. It would not be surprising if there were some letdown in April shipments and orders, because motor car builders have liberally stocked their distributors and production will depend in no small measure on the retail movement. Agricultural implement manufacturers are taking good shipments of cold-finished steel bars, and a fair demand is reported from textile machinery builders. Prices are holding well, with 2.40c., base Pittsburgh, well observed on the general run of orders.

**Hot-Rolled Flats.**—A good movement of hot-rolled strips is reported, but it is almost entirely on old or

### THE IRON AGE Composite Prices

#### Finished Steel

March 29, 1927, 2.367c. a Lb.

One week ago	2.367c.
One month ago	2.367c.
One year ago	2.439c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 87 per cent of the United States output of finished steel.

	High	Low
1927	2.453c.	Jan. 4: 2.367c.
1926	2.453c.	Jan. 5: 2.403c.
1925	2.560c.	Jan. 6: 2.396c.
1924	2.789c.	Jan. 15: 2.460c.
1923	2.824c.	April 24: 2.446c.
		Feb. 21
		May 18
		Aug. 18
		Oct. 14
		Jan. 2

#### Pig Iron

March 29, 1927, \$19.13 a Gross Ton

One week ago	\$19.04
One month ago	18.96
One year ago	21.63
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1927	\$19.71	Jan. 4: \$18.96
1926	21.54	Jan. 5: 19.46
1925	22.50	Jan. 13: 18.96
1924	22.88	Feb. 26: 19.21
1923	30.86	March 20: 20.77
		Feb. 15
		July 13
		July 7
		Nov. 3
		Nov. 20

# Mill Prices of Finished Iron and Steel Products

## Iron and Steel Bars

### Soft Steel

#### Base Per Lb.

F.o.b. Pittsburgh mills	1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
Del'd Philadelphia	2.22c.
Del'd New York	2.24c.
Del'd Cleveland	2.09c.
F.o.b. Cleveland	1.90c.
F.o.b. Birmingham	2.05c. to 2.15c.
C.I.F. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

### Billet Steel Reinforcing

F.o.b. Pittsburgh mills	1.90c.
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### Rail Steel

F.o.b. mill	1.70c. to 1.80c.
F.o.b. Chicago	1.90c. to 2.00c.

### Iron

Common iron, f.o.b. Chicago	2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c. to 2.22c.
Common iron, del'd New York	2.14c. to 2.24c.

### Tank Plates

F.o.b. Pittsburgh mill	1.80c. to 1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	1.95c. to 2.05c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.12c. to 2.22c.
Del'd New York	2.14c. to 2.24c.
C.I.F. Pacific ports	2.25c. to 2.30c.

### Structural Shapes

F.o.b. Pittsburgh mills	1.90c.
F.o.b. Chicago	2.00c. to 2.10c.
F.o.b. Birmingham	2.05c. to 2.15c.
Del'd Cleveland	2.09c.
Del'd Philadelphia	2.12c. to 2.22c.
Del'd New York	2.14c. to 2.24c.
C.I.F. Pacific ports	2.25c. to 2.30c.

Hot-Rolled Flats (Hoops, Bands and Strips)	Base Per Lb.
All gages, narrower than 6 in., P'gh	2.30c.
All gages, 6 in. to 12 in., P'gh	2.10c.
All gages, narrower than 6 in., Chicago	2.40c. to 2.60c.

All gages, 6 in. and wider, Chicago	2.30c. to 2.50c.
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\*Mills follow plate or sheet prices according to gage on wider than 12 in.

### Cold-Finished Steel

Bars, f.o.b. Pittsburgh mills	2.40c.
Bars, f.o.b. Chicago	2.40c.
Bars, Cleveland	2.45c.
Shafting, ground, f.o.b. mill	*2.55c. to 3.00c.
Strips, f.o.b. Pittsburgh mills	3.00c.
Strips, f.o.b. Cleveland mills	3.00c.
Strips, delivered Chicago	3.30c. to 3.55c.

\*According to size.

### Wire Products

(To jobbers in car lots, f.o.b. Pittsburgh and Cleveland)

#### Base Per Keg

Wire nails	\$2.55
Galv'd nails	4.55
Galvanized staples	3.25
Polished staples	3.00
Cement coated nails	2.55

#### Base Per 100 Lb.

Bright plain wire, No. 9 gage	\$2.40
Annealed fence wire	2.55
Spring wire	3.40
Galv'd wire, No. 9	3.00
Barbed wire, galv'd	3.25
Barbed wire, painted	3.00

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., mill \$3 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

### Woven Wire Fence

#### Base to Retailers Per Net Ton

F.o.b. Pittsburgh	\$65.00
F.o.b. Cleveland	65.00
F.o.b. Anderson, Ind.	66.00
F.o.b. Chicago district mills	67.00
F.o.b. Duluth	68.00
F.o.b. Birmingham	68.00

## Sheets

### Blue Annealed

#### Base Per Lb.

Nos. 9 and 10, f.o.b. Pittsburgh	2.20c. to 2.25c.
Nos. 9 and 10, f.o.b. Ohio mill	2.20c. to 2.25c.
Nos. 9 and 10, f.o.b. Chicago dist. mill	2.25c. to 2.45c.
Nos. 9 and 10, del'd Philadelphia	2.52c. to 2.57c.
Nos. 9 and 10, f.o.b. Birmingham	2.85c. to 2.45c.

### Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.75c. to 2.90c.
No. 24, f.o.b. Ohio mill	2.80c. to 2.90c.
No. 24, f.o.b. Ch'go dist. mill	2.95c. to 3.05c.
No. 24, del'd Philadelphia	3.07c. to 3.17c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

## Track Equipment

### (F.o.b. Mill)

#### Base Per 100 Lb.

Spikes, $\frac{1}{2}$ in. and larger	\$2.80 to \$3.00
Spikes, $\frac{1}{4}$ in. and smaller	2.90 to 3.25
Spikes, boat and barge	3.25
Track bolts, all sizes	3.90 to 4.50
Tie plates, steel	2.25
Angle bars	2.75

## Welded Pipe

### Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

#### Butt Weld

Steel	Black	Galv.	Iron	Black	Galv.
$\frac{1}{2}$	45	$19\frac{1}{2}$	$\frac{1}{2}$ to $\frac{1}{4}$	11	+80
$\frac{1}{4}$ to $\frac{3}{8}$	51	$25\frac{1}{2}$	$\frac{1}{2}$	22	2
$\frac{1}{2}$	56	$42\frac{1}{2}$	$\frac{1}{2}$	28	11
$\frac{3}{4}$	60	$48\frac{1}{2}$	1 to $1\frac{1}{2}$	30	18
1 to 3	62	$50\frac{1}{2}$			

#### Lap Weld

Butt Weld, extra strong, plain ends					
$\frac{1}{2}$	41	$24\frac{1}{2}$	$\frac{1}{2}$ to $\frac{1}{4}$	+19	+54
$\frac{1}{4}$ to $\frac{3}{8}$	47	$30\frac{1}{2}$	$\frac{1}{2}$	21	17
$\frac{3}{8}$	58	$42\frac{1}{2}$	$\frac{1}{2}$	28	18
$\frac{1}{2}$	58	$47\frac{1}{2}$	1 to $1\frac{1}{2}$	30	14
1 to $1\frac{1}{2}$	60	$49\frac{1}{2}$			
2 to 3	61	$50\frac{1}{2}$			

### Lap Weld, extra strong, plain ends

2	58	$42\frac{1}{2}$	2	28	9
$2\frac{1}{2}$	57	$46\frac{1}{2}$	$2\frac{1}{2}$	29	15
$3\frac{1}{2}$	56	$45\frac{1}{2}$	$3\frac{1}{2}$ to 6	28	14
7 and 8	56	$39\frac{1}{2}$	7 to 8	21	15
9 and 10	54	$32\frac{1}{2}$	9 to 12	16	8
11 and 12	44	$31\frac{1}{2}$			

To the large jobbing trade the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by  $1\frac{1}{2}$  points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to large jobbers by one point with supplementary discounts of 5 and  $2\frac{1}{2}$ %.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is  $2\frac{1}{2}$  points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

## Boiler Tubes

### Base Discounts, f.o.b. Pittsburgh

Charcoal Iron			
2 to $2\frac{1}{2}$ in.	27	$1\frac{1}{2}$ in.	+18
$2\frac{1}{2}$ to $3\frac{1}{2}$ in.	37	$1\frac{1}{2}$ to $1\frac{1}{4}$ in.	+8
$3\frac{1}{2}$ in.	40	2 to $2\frac{1}{2}$ in.	2
7 to 8	52	7 to 8	21
9 and 10	45	$2\frac{1}{2}$ to 3 in.	7
11 and 12	44	$3\frac{1}{2}$ to $4\frac{1}{2}$ in.	9

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 tens to 2 tens and 1 five on charcoal iron tubes.

### Standard Commercial Seamless Boiler Tubes

#### Cold Drawn

1 in.	60	3 in.	45
$1\frac{1}{2}$ to $1\frac{1}{4}$ in.	52	$3\frac{1}{2}$ to $3\frac{1}{4}$ in.	47
$1\frac{1}{4}$ in.	36	4 in.	50
2 to $2\frac{1}{2}$ in.	31	$4\frac{1}{2}$ , 5 and 6 in.	48
$2\frac{1}{2}$ to $2\frac{3}{4}$ in.	39		

Less carloads, 4 points less. Add 28 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

### Per Cent Off List

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ders carrying prices well under those now quoted. The present prices have not been seriously tested and probably will not be until third quarter requirements are in sight. Hoops and bands are moving steadily, and on new business makers are adhering firmly to 2.30c., base.

**Cold-Rolled Strips.**—Production of automobiles is high enough to require heavy supplies of cold-rolled strips, and makers in this district supplying that industry are shipping and producing at well up toward 80 per cent of capacity. On new business a minimum of 3c., base, for carloads, is well observed.

**Steel and Iron Bars.**—Mills in this district are getting good specifications from the makers of cold-finished steel bars, and there is a little anticipation of requirements on the part of those or other consumers. Long scheduling of mill operations is not yet possible, but there is a steadiness of orders that reduces the anxiety at the end of each week as to where the following week's rollings are to come from. In this district there are no deviations from 1.90c., base Pittsburgh, on the general run of current orders. Iron bars are dull and easy.

**Structural Steel.**—Mills have a good complement of orders and are running well. If the activity of the engineering departments of the steel fabricating companies is a criterion, a good deal of business is ahead. Structural shapes are still held at 1.90c., base Pittsburgh, on the ordinary tonnages coming out in this district.

**Plates.**—Large pipe and tankage are creating business for the plate mills, and there is 12,000 tons, mostly plates, in an inquiry from a large coal company for 75 steel deck barges, on which early delivery is wanted on 40. Mills are firm at 1.90c., base Pittsburgh, for ordinary tonnages of plates.

**Bolts, Nuts and Rivets.**—The change in the mode of quoting bolts and nuts appears to be setting up no hindrance to the placing of second quarter contracts, and manufacturers take this as evidence that the new order is acceptable to buyers. All makers have gone along with the advance in large rivets, but business has been halted to some extent by a desire on the part of buyers to study their new costs.

**Coke and Coal.**—The coke and coal market is still favorable to buyers, and there is little evidence of concern over the fact that so far as the Central competitive field is concerned, an agreement between the operators and the miners' union will not come until after there has been a struggle. Spot furnace coke is freely available at \$3.25 per net ton at ovens, and it is probable that even less could be done if pig iron producers were not already well covered. Spot foundry coke still sells generally at \$4.25 to \$4.50, with the usual premiums for some extra choice brands. Coal business has actually grown smaller instead of greater with the approach of April 1.

**Old Material.**—Consumer demand for scrap is light in this district, but the market has a strong undertone because offerings are light and likely to continue so for a time, since all outside markets are more active and relatively stronger than this one. Dealers were

more anxious for orders a week ago than they are now and are inclined to believe that the market will be stronger before it again weakens, although there is growing acceptance of the idea that the coal strike will have little effect upon iron production in the next 30 days. Blast furnace grades of scrap have sold at as high as \$13 and the acid open-hearth furnace material again has brought \$19. The April list of the Baltimore & Ohio Railroad contains 24,650 gross tons of scrap, including 6900 tons of No. 1 rails and 6385 tons of No. 1 heavy melting steel; bids close April 4.

*Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:*

**Basic Open-Hearth Furnace Grades:**

Heavy melting steel	\$16.50 to \$17.00
Scrap rails	16.00 to 16.50
Compressed sheet steel	15.50 to 16.00
Bundled sheets, sides and ends	14.50 to 15.00
Cast iron carwheels	16.00 to 16.50
Sheet bar crops, ordinary	16.50 to 17.00
Heavy breakable cast	15.50 to 16.00
No. 2 railroad wrought	16.50 to 17.00
Heavy steel axle turnings	14.50 to 15.00
Machine shop turnings	12.00 to 12.25

**Acid Open-Hearth Furnace Grades:**

Railroad knuckles and couplers	18.50 to 19.00
Railroad coil and leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phosphorus billet and bloom ends	20.50 to 21.00
Low phosphorus mill plate	20.00 to 20.50
Low phosphorus, light grade	18.00 to 18.50
Low phosphorus sheet bar crops	18.00 to 18.50
Heavy steel axle turnings	14.50 to 15.00

**Electric Furnace Grades:**

Low phosphorus punchings	18.50 to 19.00
Heavy steel axle turnings	14.50 to 15.00

**Blast Furnace Grades:**

Short shoveling steel turnings	12.50 to 13.00
Short mixed borings and turnings	12.50 to 13.00
Cast iron borings	12.50 to 13.00
No. 2 busheling	12.50 to 13.00

**Rolling Mill Grades:**

Steel car axles	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50

**Cupola Grades:**

No. 1 cast	16.00 to 16.50
Rails, 3 ft. and under	19.50 to 20.00

**Malleable Grades:**

Railroad	16.50 to 17.00
Industrial	16.00 to 16.50
Agricultural	15.50 to 16.00

## Continuous Process for Strip Steel

To meet the demand of the stamping and automotive parts makers for greater accuracy in strip steel, the Laclede Steel Co., St. Louis, now has under construction at its Alton, Ill., plant a hot strip mill designed to improve finish, roll closer to gage, reduce camber and deliver in long lengths, coiled. It will be the first mill to apply the principle of 4-high rolls to the manufacture of thin strip steel. This method has been tried with success in the production of wide plates, sheets and the newer product, stripsheets.

In the case of the new Laclede mill the procedure, starting with the drawing of the billet, slab, or bloom from a Morgan continuous furnace, will be to lead it through an edging pass, cut to required length in a flying shear, break down in four stands of Morgan roughing rolls, pass through an intermediate stand, the finishing to be through five four-high roller-bearing sets of finishing rolls, another flying shear and through the run-out trough to a specially-designed hot bed.

The dominant idea in the design of the run-out and the hot beds is to effect almost perfect alignment and flatness in the finished strip. The three edgers will be independently driven by direct current. The roughing, intermediate and No. 6 stands will be driven from one motor, while the four-high finishing stands will be driven by independent direct current motors, allowing individual speed adjustments. The entire layout is being constructed by the United Engineering & Foundry Co., Pittsburgh.

Consumption of coal in the industries in February has been estimated by the National Association of Purchasing Agents at 43,536,000 net tons. This is a slight reduction from the December and January figures, although the tonnage per working day increased. Stocks of coal in industries have steadily increased since last fall. The estimate for March 1 is 65,735,000 tons, a gain of nearly 15 per cent over the 57,450,000 tons a month before. The gain since Oct. 1 has been more than 21,000,000 tons.

### Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished shafting and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.60c. to 3.65c.
Hoops	4.00c. to 4.50c.
Black sheets (No. 24 gage), 25 or more bundles	3.75c.
Galvanized sheets (No. 24 gage), 25 or more bundles	4.50c.
Blue annealed sheets (No. 10 gage), 25 or more sheets	3.30c.
Spikes, large	3.30c. to 3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts	62 1/2 per cent off list
Large rivets, base per 100 lb.	\$3.50
Wire, black soft annealed, base per 100 lb.	2.90
Wire, galvanized soft, base per 100 lb.	2.90
Common wire nails, per keg	2.90
Cement coated nails, per keg	2.95

# Semi-Finished Steel, Raw Materials, Bolts and Rivets

## Mill Prices of Semi-Finished Steel

F.o.b. Pittsburgh or Youngstown

### Billets and Blooms

Per Gross Ton

Rerolling, 4-in. and over.....	\$34.00
Rerolling, under 4-in. to and including 1½-in. ....	\$34.50 to 35.00
Forging, ordinary .....	40.00
Forging, guaranteed .....	45.00

### Sheet Bars

Per Gross Ton

Open-hearth or Bessemer.....	\$34.00
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### Slabs

Per Gross Ton

8 in. x 2 in. and larger.....	\$34.00
Smaller than 8 in. x 2 in. ....	\$34.50 to 35.00

### Skelp

Per Lb.

Grooved .....	1.90c.
Sheared .....	1.90c.
Universal .....	1.90c.

### Wire Rods

Per Gross Ton

Common soft, base.....	\$43.00
Screw stock .....	\$5.00 per ton over base
Carbon 0.20% to 0.40% .....	3.00 per ton over base
Carbon 0.41% to 0.55% .....	5.00 per ton over base
Carbon 0.56% to 0.75% .....	7.50 per ton over base
Carbon over 0.75% .....	10.00 per ton over base
Acid .....	15.00 per ton over base

\*Chicago mill base is \$44. Cleveland mill base, \$43.

## Prices of Raw Materials

### Ores

#### Lake Superior Ores, Delivered Lower Lake Ports

Per Gross Ton

Old range Bessemer, 51.50% iron.....	\$4.55
Old range non-Bessemer, 51.50% iron.....	4.40
Mesabi Bessemer, 51.50% iron.....	4.40
Mesabi non-Bessemer, 51.50% iron.....	4.25
High phosphorus, 51.50% iron.....	4.15

Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria, 10.00c. to 10.50c.	

Iron ore, Swedish, average 66% iron, 9.50c. to 10.00c.	
Manganese ore, washed, 52% manganese, from the Caucasus.....	40c. to 41c.

Manganese ore, washed, 52% manganese, from the Caucasus.....	40c. to 41c.
Tungsten ore, high grade, per unit, in 60% concentrates.....	\$12.00 to \$13.50

Chrome ore, Indian basic, 48% Cr <sub>2</sub> O <sub>3</sub> crude, c.i.f. Atlantic seaboard.....	Per Ton
\$22.50	Per Lb.

Molybdenum ore, 85% concentrates of MoS <sub>2</sub> , delivered	Per Lb.
50c. to 55c.	

### Coke

Per Net Ton

Furnace, f.o.b. Connellsville	Per Net Ton
prompt .....	\$3.25

Foundry, f.o.b. Connellsville	Per Net Ton
prompt .....	\$4.25 to 4.50

Foundry, by-product, Ch'go ovens	Per Net Ton
9.75	

Foundry, by-product, New England, del'd .....	12.50
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Foundry, by-product, Newark or Jersey City, delivered.....	9.59 to 10.77
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Foundry, Birmingham .....	5.50 to 6.00
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Foundry, by-product, St. Louis.....	10.50
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### Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines .....	Per Net Ton
\$1.60 to \$1.90	

Mine run coking coal, f.o.b. W. Pa. mines .....	Per Net Ton
1.80 to 2.00	

Mine run gas coal, f.o.b. Pa. mines .....	Per Net Ton
2.00 to 2.10	

Steam slack, f.o.b. W. Pa. mines .....	Per Net Ton
1.45 to 1.50	

Gas slack, f.o.b. W. Pa. mines .....	Per Net Ton
1.50 to 1.60	

### Ferromanganese

Per Gross Ton

Domestic, 80%, furnace or seab'd.....	\$100.00
Foreign, 80%, Atlantic or Gulf port, duty paid .....	100.00

### Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21% .....	\$37.00
Domestic, 16 to 19% .....	36.00

### Electric Ferrosilicon

Per Gross Ton Delivered

50% .....	\$85.00
75% .....	145.00

### Bessemer Ferrosilicon

Per Gross Ton Furnace

10% .....	\$35.00
11% .....	37.00
12% .....	44.50 to 46.00

### Silvery Iron

Per Gross Ton Furnace

6% .....	\$26.50
7% .....	27.50
8% .....	28.50
9% .....	30.00
10% .....	\$32.00
11% .....	34.00
12% .....	36.00

### Other Ferroalloys

Ferro tungsten, per lb. contained metal, del'd .....	\$1.05 to \$1.10
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Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr, per lb. contained Cr, delivered, in carloads .....	11.50c.
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Ferrovanadium, per lb. contained vanadium, f.o.b. furnace .....	\$3.25 to \$4.00
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Ferrocarbontitanium, 15 to 18% per net ton, f.o.b. furnace, in carloads .....	\$200.00
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Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per net ton .....	\$91.00
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Ferrophosphorus, electric, 24%, f.o.b. Alton, Ill., per net ton .....	\$122.50
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### Fluxes and Refractories

Fluorspar Per Net Ton

Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines .....	\$18.00
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No. 2 lump, Illinois and Kentucky mines .....	\$20.00
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Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid .....	\$17.50
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Fire Clay Per 1000 f.o.b. Works

High Duty Moderate Duty

Pennsylvania .....	\$40.00 to \$43.00
Maryland .....	38.00 to 40.00
New Jersey .....	35.00 to 37.00
Ohio .....	38.00 to 40.00
Kentucky .....	38.00 to 40.00
Illinois .....	38.00 to 40.00
Missouri .....	38.00 to 40.00
Ground fire clay, per ton .....	6.50 to 7.50

Silica Brick Per 1000 f.o.b. Works

Pennsylvania .....	\$40.00
Chicago .....	49.00
Birmingham .....	50.00
Silica clay, per ton .....	38.00 to 40.00

Magnesite Brick Per Net Ton

Standard sizes, f.o.b. Baltimore and Chester, Pa. ....	\$6

## Chicago

### All Gary Stacks Now in Blast—Heavy Buying of Pig Iron

CHICAGO, March 29.—The Gary Works of the Steel Corporation is operating at full capacity, the twelfth and last blast furnace having been blown in early this week. With eight stacks in at South Chicago and one at Joliet, the leading producer is now operating 21 out of 27 furnaces. The total count of active steel works stacks in this district now stands at 30 out of 36.

Sales for the week, the largest this year by a wide margin, represent in some measure an expansion of second quarter buying, but in the main orders don't reach beyond 60 days' requirements. The willingness of buyers to extend commitments past the usual 30-day period does not appear to be a reflection of the threat of a coal strike, as in most instances orders for steel are in close step with actual orders in hand for manufactured goods. As in weeks past, the feature of present buying lies in the unusually large number of orders—numerically topping the corresponding period a year ago, and in the breadth of demand both as to commodity and consuming industry. Specifications are in larger volume and first quarter shipments are practically on a par with a year ago. There is no evidence at hand to indicate an accumulation of semi-finished steel by the mills.

**Pig Iron.**—Second quarter buying of pig iron in this district is heavier than for any three-month period, with one exception, in the last three years. A feature of the present movement is the lack of open inquiry, users apparently being satisfied with prices. A stove manufacturer in western Michigan has placed 2000 tons of foundry iron, and a melter in Chicago has purchased close to 5000 tons. Furnace stocks are of fair size but lack balance, and with orders being received in excess of present production, one furnace operator is giving serious consideration to lighting a stack on which repairs are nearly completed. Inquiry for foundry and malleable iron totals about 15,000 tons, or one-fourth of what is usually expected by the trade during buying movements under more competitive conditions.

*Prices per gross ton at Chicago:*

Northern No. 2 foundry, sil. 1.75 to 2.25	\$20.00
N'th'n No. 1 fdy. sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Superior charcoal, averaging sil. 1.50	27.04
Southern No. 2 fdy. (all rail)	24.01
Southern No. 2 (barge and rail)	22.18
Low phos., sil. 1 to 2 per cent.	
copper free	\$31.50 to 32.50
Silvery, sil. 8 per cent.	33.29
Bessemer ferrosilicon, 14 to 15 per cent	46.79

Prices are delivered at consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

**Ferroalloys.**—On the whole, this market is quiet. Spiegeleisen is tight for prompt shipment, and the price is firm at \$44.76, delivered.

*Prices delivered Chicago:* 80 per cent ferromanganese, \$107.56; 50 per cent ferrosilicon, \$85; spiegeleisen, 18 to 22 per cent, \$44.76.

**Plates.**—The demand for oil storage tanks is urgent, and Chicago district mills are being pressed for early delivery on orders for tank steel that have been received in the last four weeks. It is not uncommon for specifications to follow orders within a day or two. Two oil refiners in the Southwest have ordered tanks requiring over 2000 tons of plates, and inquiry now before the trade totals between 10,000 and 15,000 tons. Plate mills are well engaged, and deliveries range from two to four weeks. In an effort to satisfy as wide a range of buyers as possible, sellers will usually book small tonnages for current rollings, but this is becoming increasingly difficult on wide and very narrow universal plates, on which the average delivery is not far from four weeks. The railroad equipment market gives more promise than for several weeks. Outstanding among fresh inquiries are 3500 freight and 121 passenger cars for the New York Central, 1500 miscellaneous freight cars for the Pere Marquette and 250 to

500 8000-gal. tank cars for the Union Tank Car Co. Specifications from the car builders are coming in at a steady rate. The impression is gaining ground that present equipment contracts will not be rushed, but will be carried through at a moderate pace in order to hold organizations intact in the hope that additional orders will be placed late in the spring, assuring at least a fair program of construction well into the middle of the year. The market on plates in Chicago appears to be narrowing down to 2c., users being required to pay 2.10c. only for very small orders of mixed sizes.

*Mill prices on plates per lb.: 2c. to 2.10c., Chicago.*

**Sheets.**—Both new buying and specifications are in larger volume, this being in some measure the result of an active demand for the heavy gages of blue annealed sheets. Prices in Chicago are taking a fair stand, but there is little or no talk of an immediate advance. Competition to the south and southwest is less keen, and prices are holding for the first time in several months. Forward contracting is making headway, and some users who manufacture seasonable commodities are disposed to add to stocks. Production of sheets in the Chicago district is not far from 90 per cent of capacity.

*Prices per lb., delivered from mill in Chicago: No. 24 black, 3c. to 3.10c.; No. 24 galvanized, 3.90c. to 4c.; No. 10 blue annealed, 2.40c. to 2.50c. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.*

**Bolts, Nuts and Rivets.**—Specifications are large as compared with a week ago. Many users have compared the old with the new list and have ordered out those commodities on which a saving can be made by taking advantage of old contracts. Contracting for the second quarter is progressing rapidly.

**Bars.**—The demand for soft steel bars is unusually good, and production in this district is near capacity. Schedules for bar shipments to the automobile trade have shown a steady increase since shortly after the turn of the year. March led February by a good margin, and programs that are now planned for April are large. Reinforcing bar warehouses are sending in more liberal specifications to obtain better balanced stocks. Shipments of soft steel bars during the first quarter of 1927 were considerably heavier than a year ago, but at the same time individual orders were smaller. Specifications from agricultural implement manufacturers are holding at an even level, and the impression is growing stronger that the farmers will not buy so heavily as a year ago. Efforts to check up on buyers' stocks have led the trade to believe that current orders and specifications are based largely on business actually on the books of consumers. New buying is a step in advance of its volume last week, and as order books grow, deliveries are extending. Soft steel bars can be had in four to six weeks, but indications point to still further deferred shipments. Mill prices are still 2c. to 2.10c., Chicago, but it is becoming increasingly difficult to obtain the higher quotation on small and mixed tonnages. Orders for iron bars form a fair total tonnage, the best in several months. Mills are operating on a hand-to-mouth basis, and deliveries on all sizes are prompt. In spite of the small amount of business in this commodity, the mill price is being well maintained at 2c., Chicago. The alloy steel bar market is active, and the increase in volume of specifications has made it necessary for Chicago producers to step-up the rate of production to almost full capacity. The automobile trade is showing greater confidence in the future and is now placing orders for 60 days in advance, whereas in February and March commitments were for not more than 30 days. The size of the average order for rail steel bars has grown materially in the last two weeks. Buyers are not building up stocks other than those required for safety, but there is a growing tendency to anticipate requirements further in advance and to put less pressure on mills for prompt delivery. New orders for the week are equal to production, which is on a double turn basis at both Chicago Heights mills. Shipments in March are running ahead of those in the third month a year ago.

*Mill prices per lb.: Soft steel bars, 2c. to 2.10c., Chicago; common bar iron, 2c., Chicago; rail steel bars, 1.90c. to 2c., Chicago.*

**Warehouse Business.**—The demand for warehouse products is slowly expanding, and prices are firm. It is unofficially reported that new discounts on bolts and nuts will become effective April 1. The schedule now under consideration calls for 60 per cent off list on machine bolts, carriage bolts and coach or lag screws. The new discount on square and hexagon hot-pressed nuts will be 60 per cent off list, and 100 pieces will be the basing unit.

**Structural Material.**—For the first time in a number of weeks this market has shown some activity in projects that require from 100 to 300 tons each, tonnages that are well suited to shops of average capacity. In the meantime, however, buildings requiring heavy tonnages are slow in coming up for final quotations. Plans for the Medinah Athletic Club, requiring about 5000 tons, are expected by the trade to be out for figures in the next week or two. The Chicago, Indianapolis & Louisville Railway has placed 650 tons of steel work with a fabricator at Indianapolis, and the Midland Structural Steel Co., Chicago, has taken 500 tons for the Garment Workers Building. Prices on fabricated material are low, and with competition unusually keen, the trade sees little or no possibility of advances in the immediate future. Large shops have fair order books and are placing a good volume of specifications with the mills. Other orders being entered at the mills are from widely scattered users who take plain material only in small lots. The aggregate of all orders is surprisingly good, however. Mill prices on structural material are fairly steady at 2c. to 2.10c., Chicago, though there is a strong tendency for the higher quotation to disappear.

*Mill prices on plain material per lb.: 2c. to 2.10c.  
Chicago.*

**Wire Products.**—The requirements of manufacturing consumers are growing, and specifications for the week show a decided improvement. Orders from the jobbing trade are more numerous and, in most cases, are larger than earlier in the month. The demand for wire products, principally fencing, is good in the East and in the Ohio River and Mississippi River Valleys, while in the Northwest the spring trade is opening earlier than usual, with good promise of reaching larger proportions than last year. Mill operations are up a trifle in some departments as producers attempt to hold stocks at the present level. Prices as a general rule are steady, although there is evidence of concessions in nails.

**Reinforcing Bars.**—Fresh inquiries are again numerous, and many outstanding projects are active. Awards for the week are in fair volume, although it is noticeable that by far the greatest number call for less than 50 tons each. Bookings by bar warehouses approximate shipments, and bending operations do not average above 40 per cent of shop capacity. The present situation is in sharp contrast with what it was a year ago at this time, when shipments represented about 70 per cent of bending capacity. Generally the market on reinforcing bars is 2.30c. to 2.75c., Chicago warehouse, for billet steel and 2.10c. to 2.55c., Chicago, for rail steel. Reports are current, however,

#### Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforcing bars, billet steel	2.30c. to 2.75c.
Cold-finished steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands	3.65c.
Hoops	4.15c.
Black sheets (No. 24)	3.05c. to 3.15c.
Galvanized sheets (No. 24)	3.90c. to 4.00c.
Blue annealed sheets (No. 10)	2.40c. to 2.45c.
Spikes, standard railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.50c.
Rivets, boiler	3.70c.
Per Cent Off List	
Machine bolts	50 and 5
Carriage bolts	47 1/2
Coach or lag screws	55 and 5
Hot-pressed nuts, squares, tapped or blank,	3.25c. off per lb.
Hot-pressed nuts, hexagons, tapped or blank,	3.75c. off per lb.
No. 8 black annealed wire, per 100 lb.	\$3.20
Common wire nails, base per keg	2.95
Cement coated nails, base per keg	2.95

that heavy shipments of rail steel bars have been made into Chicago from the south and east at prices to warehouses below the quotations from Chicago mills. Fresh inquiry and new awards are shown on page 975.

**Rails and Track Supplies.**—Production of standard-section rails holds steady at 85 per cent of capacity. The Chesapeake & Ohio is said to have placed orders for track accessories with Eastern manufacturers. The light rail market is dull.

*Prices f.o.b. mill, per gross ton: Standard-section open-hearth and Bessemer rails, \$43; light rails, rolled from billets, \$36 to \$38. Per Lb.: Standard railroad spikes, 2.90c.; track bolts with square nuts, 3.90c.; steel tie plates, 2.35c.; angle bars, 2.75c.*

**Cast Iron Pipe.**—The United States Cast Iron Pipe & Foundry Co. has booked 2400 tons of 6 to 16-in. pipe for Akron, Ohio. The Alabama Pipe Co. is said to be low at Detroit on 125 tons of 12-in. Class C pipe. This market is quiet except from the standpoint of small orders from private buyers. Foundries are said to have well arranged schedules, and many small orders are being shipped promptly. Efforts by producers to raise the market to \$37, Birmingham, have not proved successful, and 6-in. and larger diameter pipe is being regularly quoted in Chicago at \$44.20 to \$45.20, delivered.

*Prices per net ton, delivered Chicago: Water pipe, 6-in. and over, \$44.20 to \$45.20; 4-in., \$48.20 to \$49.20; Class A and gas pipe, \$4 extra.*

**Old Material.**—The purchase, late last week, of between 5000 and 10,000 tons of heavy melting steel by a user who has not been in the market for about two years has served to add strength to the market. Heavy melting steel is up 25c., and dealers, believing that a general advance is in prospect, are holding out for higher prices on practically all grades. Buyers are watching the market closely and are inclined to believe that a revision upward of prices cannot be made to hold for any length of time and that their present stocks, which are fair in size, may prove ample to carry them through a bullish movement in the market. Deliveries of coal have held back shipments of railroad scrap, but at the same time country scrap is moving more freely and there is little or no evidence of a shortage of any grade unless it be cast iron borings, which are not being produced at a rate quite up to consumption. Consumer purchases, on the whole, are of moderate size. Inquiry is more active than a week ago, but it is based on efforts to feel out the market rather than to place actual orders. Advertised railroad lists include a blank list from the Michigan Central and 7000 tons offered by the Chicago, Milwaukee & St. Paul.

*Prices delivered consumers' yards, Chicago:*

Per Gross Ton

Heavy melting steel	\$13.25 to \$13.75
Shoveling steel	13.00 to 13.50
Frogs, switches and guards, cut apart, and miscellaneous rails	14.75 to 15.25
Steel rails, less than 3 ft.	17.25 to 17.75
Iron rails	12.50 to 14.00
Hydraulic compressed sheets	11.50 to 12.00
Drop forge flashings	9.50 to 10.00
Machine shop turnings	7.50 to 8.00
Forged, cast and rolled steel car-wheels	16.50 to 17.00
Railroad tires, charging box size	16.75 to 17.25
Railroad leaf springs, cut apart	16.75 to 17.25
Steel couplers and knuckles	16.00 to 16.50
Coil springs	17.00 to 17.50
Low phosphorus punchings	15.50 to 16.00
Axle turnings, foundry grade	13.00 to 13.50
Axle turnings, blast fur. grade	11.00 to 11.50
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
*Relaying rails, 56 to 60 lb.	25.50 to 26.50
*Relaying rails, 65 lb. and heavier	26.00 to 31.00
Rerolling rails	16.00 to 16.50
Railroad malleable	16.00 to 16.50
Agricultural malleable	14.75 to 15.25
Angle bars, steel	14.75 to 15.25
Cast iron carwheels	15.00 to 15.50

Per Net Ton

No. 1 machinery cast	16.50 to 17.00
No. 1 railroad cast	15.75 to 16.25
No. 1 agricultural cast	14.75 to 15.25
Stove plate	13.50 to 14.00
Grate bars	13.00 to 13.50
Brake shoes	12.00 to 12.50
Iron angle and splice bars	14.00 to 14.50
Iron arch bars and transoms	18.75 to 19.25
Iron car axles	21.50 to 22.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.75 to 12.25
No. 1 busheling	16.25 to 16.75
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	16.00 to 16.50
Pipes and flues	8.00 to 8.50

\*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

## New York

### Pig Iron Buyers Covered—Impending Strike No Stimulus to Steel Buying

NEW YORK, March 29.—Pig iron sales by local brokers during the past week totaled about 6500 tons, or less than one-half what was sold in the previous week. The market is expected to remain quiet for some time to come in view of the generous purchases by melters during the recent buying movement. According to one representative estimate, 90 per cent of the foundries in this district are covered through second quarter and 25 to 40 per cent have bought their requirements well into the third quarter. New inquiry is light, and business still pending totals only 2000 to 3000 tons. One large buyer, however, is sounding out the market for third quarter and may alone buy several thousand tons. Another inquiry calls for 500 tons of foundry for third quarter. Some furnaces still hesitate to obligate themselves for that far ahead and others want higher than current prices for that delivery. The attitude of the producers will undoubtedly become more definite after April 1, the scheduled date for the threatened coal strike. The offer of the miners' union to continue to work at present wages pending the negotiation of basic wage scales by districts is regarded by some as merely a strategic move and by others as an indication that the strike will not occur. Meanwhile prices on pig iron for second quarter show little real change. Quotations on Buffalo foundry iron have been advanced to a minimum of \$17.25, base furnace, but they have not yet undergone a real test on that basis. An eastern New York State producer is still quoting \$18, furnace. The Consolidated Machine Tool Corporation, Rochester, N. Y., has closed for 1000 tons of foundry for Wilmington, Del. The New York Central has closed for 425 tons for its Frankfort, N. Y., and Elkhart, Ind., shops. Abendroth Brothers, Port Chester, N. Y., who were inquiring for 1000 to 2000 tons of foundry, are also among recent buyers. English low phosphorus is being offered at about \$25, duty paid, port of entry, but sales have been few, since most American users are well covered ahead.

Prices per gross ton, delivered New York District:		
Buffalo No. 2 fdy., sil. 1.75 to 2.25 (all rail)		\$21.91 to \$22.41
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.89 to 23.02	
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.39 to 23.52	
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	22.89 to 24.02	
No. 2 Virginia fdy., sil. 1.75 to 2.25	26.04 to 27.04	

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania, \$5.54 from Virginia.

**Ferroalloys.**—No large tonnages of ferromanganese, either as inquiries or sales, are noted, but small lots up to 100 tons are changing hands now and then at regular prices. British ferromanganese is now available in quantity, but there is not much demand for either the domestic or the foreign alloy. Several sellers of foreign spiegeleisen, both British and German, are active and sales of a number of small lots are reported at the usual quotation, which is slightly above the domestic material. Supplies of the latter continue small. Specifications on contract for both of the manganese alloys continue heavy and this is also true of ferro-silicon and ferrochromium.

**Fluorspar.**—A good grade of foreign fluorspar was recently quoted at less than \$20.50 per net ton, delivered Pittsburgh, which is the equivalent of less than \$16, domestic mines. Most of the large users of spar still have stocks bought last fall, but they are expected in the market within the next 30 or 60 days. Meanwhile competition is keen for such business as is moving, and some domestic material has been sold at as low as \$17, mines, or \$1 below the general market.

**Cast Iron Pipe.**—Inquiry by municipalities is still small, but there is a fair volume of purchasing by private companies. Hamburg, N. J., opens bids March 30 on about 500 tons of water pipe. The New Haven Gas Co., New Haven, Conn., is in the market for about 900 tons of 16-in. gas pipe and fittings. Included in recent purchases of pipe is 600 tons of centrifugally

cast water pipe to be installed by a contractor at Flushing Park, N. J. The Department of Water Supply, Gas and Electricity, New York, has awarded about 1700 tons of pipe to the Warren Foundry & Pipe Co. Albany, N. Y., has placed 3000 tons of water pipe with B. Nicoll & Co., New York, agents for the Pont-a-Mousson works in France.

*Prices per net ton, delivered New York:* Water pipe, 6-in. and larger, \$47.60 to \$48.60; 4-in. and 5-in. \$52.60 to \$53.60; 3-in., \$62.60 to \$63.60; Class A and gas pipe, \$5 extra.

**Finished Steel.**—A moderate degree of improvement in buying has developed within the past week, but it covers normal expansion of seasonal requirements rather than any scurrying on the part of buyers because of apprehension as to the effects of the soft-coal strike, now nearly at hand. As a matter of fact, consumers of steel are making no preparations beyond their near-by requirements, and sales for delivery beyond April are few. Steel companies are giving more thought to the coal situation than consumers, and predictions from that quarter are that advances in prices on some products are not unlikely if the coal strike forces up costs of production. At present, buyers do not seem to take this very seriously. The principal

### Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.34c.
Soft steel bars and small shapes	3.24c.
Iron bars	3.24c.
Iron bars, Swedish charcoal	7.00c. to 7.25c.
Cold-finished steel shafting and screw stock—	

Rounds and hexagons	4.00c.
Flats and squares	4.50c.
Cold-rolled strip, soft and quarter hard	5.75c.
Hoops	4.49c.
Bands	3.99c.
Blue annealed sheets (No. 10 gage)	3.89c.
Long terne sheets (No. 24 gage)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galvanized annealed	5.15c.
Tire steel, 1 1/2 x 1/2 in. and larger	3.30c.
Smooth finish, 1 to 2 1/2 x 1/4 in. and larger	3.65c.
Open-hearth spring steel, bases	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread	40, 10 and 10
Carriage bolts, cut thread	30 and 10
Coach screws	40, 10 and 10
Boiler Tubes—	

	Per 100 Ft.
Lap welded steel, 2-in.	\$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

	Discounts on Welded Pipe
Standard Steel—	
1/2-in. butt	46
5/8-in. butt	51
13/16-in. butt	53
2 1/2-6-in. lap	48
7 and 8-in. lap	44
11 and 12-in. lap	37
Wrought Iron—	
1/2-in. butt	4
5/8-in. butt	11
1-1 1/2-in. butt	14
2-in. lap	5
3-6-in. lap	11
7-12-in. lap	3

	Tin Plate (14 x 20 in.)
Prime	Seconds
Coke, 100 lb. base box	\$6.45
Charcoal, per box	A
IC	\$9.70
IX	12.00
IXX	13.90

	Terne Plate (14 x 20 in.)
IC—20-lb. coating	\$10.00 to \$11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25
Sheets, Box Annealed—Black, C. R. One Pass	

	Per Lb.
Nos. 18 to 20	4.00c.
No. 22	4.15c.
No. 24	4.20c.
No. 26	4.30c.
No. 28*	4.45c.
No. 30	4.70c.

	Sheets, Galvanized
No. 14	4.35c. to 4.60c.
No. 16	4.45c. to 4.70c.
No. 18	4.60c.
No. 20	4.75c.
No. 22	4.80c.
No. 24	4.95c.
No. 26	5.20c.
No. 28*	5.45c.
No. 30	5.85c.

\*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

development in the price situation has to do with sheets, it being apparent that the near approach of the second quarter has not brought many sales or contracts for that period at the recently established higher level of prices. For immediate specification, sheet mills have sold black sheets at 2.80c., galvanized at 3.65c. and blue annealed at 2.20c., Pittsburgh. Prices on hot rolled strip steel are being somewhat better maintained, there being few concessions from 2.30c., Pittsburgh, for narrow sizes and 2.10c. for wide strips. Although building operations continue on a fairly large scale, there is still weakness in quotations on fabricated structural steel, and this in turn is reflected in mill prices, some large tonnages of plain material having lately been sold as low as 1.75c., Pittsburgh. On ordinary lots, quotations are 1.80c. to 1.90c. Bookings of fabricated steel by members of the Structural Steel Board of Trade of New York for March will fall below February. The largest local structural steel order of the week is 5500 tons for the Harriman Building, 39 Broadway. A revival of car-building prospects has come with the appearance of inquiries for 3500 freight cars and 121 passenger cars for the New York Central Lines, 1500 freight cars for the Pere Marquette, 1150 mine cars for the Consolidation Coal Co. and 250 to 500 tank cars for the Union Tank Car Co. The New York Central Lines will take bids also on Thursday of this week for their second quarter steel requirements.

*Mill prices per lb., delivered New York:* Soft steel bars, 2.24c.; plates, 2.14c. to 2.24c.; structural shapes, 2.14c. to 2.24c.; bar iron, 2.14c. to 2.24c.

**Reinforcing Bars.**—The McClintic-Marshall Co. will furnish 750 tons of bars for a loft building in Manhattan. Three other jobs, amounting to 200 tons each, have been let in the last few days, and the volume of small orders has been the greatest in several weeks. No large inquiries have been reported recently, but a large tonnage is involved in school buildings, road work and small jobs on which operations are getting under way. Increased demand has not brought a weakening in price, and distributors feel now that the present price schedules will be maintained throughout the spring and early summer months.

*Prices per lb. on billet steel reinforcing bars:* From mill, 2c., Pittsburgh. Out of New York warehouse, 3.15c., delivered at job. Out of Youngstown warehouse, 2.50c., Youngstown, or 2.87½c., delivered New York.

**Warehouse Business.**—March has been an active month with the exception of a few days when cold weather apparently caused a slight curtailment of purchasing. Demand for structural material continues good, and a fair volume of black and galvanized sheet business is reported. Effective April 1, the new list on bolts, nuts and rivets becomes effective on quotations from stock. On the new schedule, machine bolts, cut thread, up to  $\frac{3}{4}$  x 6 in., will be 50 per cent off list in broken kegs and 50 and 10 per cent off list in full kegs. Sizes from  $\frac{3}{4}$  x 6 in. to 1 in. x 30 in. will be 45 per cent off list in broken kegs and 50 per cent off in full kegs.

**Coke.**—Market conditions continue unaffected by the impending coal strike. Standard foundry grade is unusually quiet at \$4.50 to \$5 per ton, Connellsburg, and standard furnace is quoted at \$3.50 per ton for prompt shipment to \$3.75 per ton on future shipment. Delivered prices for foundry coke are: To northern New Jersey, \$8.53 to \$9.03; New York or Brooklyn, \$9.29 to \$9.79; Newark or Jersey City, N. J., \$8.41 to \$8.91 per ton. By-product foundry coke ranges from \$9.59 to \$10.77 per net ton, delivered Newark or Jersey City, N. J.

**Old Material.**—The market is substantially unchanged and quiet. No. 1 heavy melting steel is still being purchased at \$14.50 per ton, delivered eastern Pennsylvania, and borings and turnings, at \$10.50 to \$11 per ton, delivered. Activity in western Pennsylvania is pointed to by some brokers as a possible cause for greater strength in the eastern Pennsylvania market. For example, on shipments of heavy melting steel from New England, \$16.50 per ton, Pittsburgh, with a \$5.70 per ton freight rate, nets the New England shipper \$10.80 per ton, while \$14.50 per ton, delivered eastern Pennsylvania, on a \$4.40 freight rate nets only \$10.10 per ton. This difference in price is also true of borings and turnings, which at \$12.50 per ton, Pitts-

burgh, net the New England seller \$6.80 per ton, while a shipment to eastern Pennsylvania at \$10.50 to \$11 per ton would bring him \$6.10 to \$6.60 per ton. However, a fair volume of both heavy melting steel and borings and turnings is moving into eastern Pennsylvania, and the necessity for payment of higher buying prices has not yet developed.

*Dealers' buying prices per gross ton, New York:*

No. 1 heavy melting steel	\$11.00 to \$11.85
Heavy melting steel (yard)	8.25 to 8.50
No. 1 heavy breakable cast	11.75 to 13.00
Stove plate (steel works)	8.50 to 8.75
Locomotive grate bars	9.00 to 9.50
Machine shop turnings	7.50 to 8.00
Cast borings (blast furnace or steel works)	8.00 to 8.25
Mixed borings and turnings	7.50 to 8.00
Steel car axles	16.25 to 16.75
Iron car axles	24.00 to 24.50
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.25 to 9.75
Forge fire	8.00 to 8.50
No. 1 railroad wrought	12.50 to 13.50
No. 1 yard wrought, long	11.50 to 12.50
Rails for rolling	11.50 to 12.00
Cast iron carwheels	11.25 to 11.75
Stove plate (foundry)	10.00 to 10.50
Malleable cast (railroad)	12.50 to 13.00
Cast borings (chemical)	12.50 to 13.00

*Prices per gross ton, delivered local foundries:*

No. 1 machinery cast	\$15.00 to \$15.50
No. 1 heavy cast (columns, building materials, etc., cupola size	13.50 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	12.50 to 13.00

## Cleveland

### March Steel Bookings Expected to Show Gain Over February—Plates Easier

CLEVELAND, March 29.—The demand for most lines of finished steel is holding up to about recent volume, and March business is expected to show a slight gain over February. Present indications point to a good volume of business through the second quarter. Mills are getting a large number of orders for small lots of steel. As buyers can secure good deliveries, they see no advantage in carrying much material in stock.

The automotive industry seems to have got up to about as high production as it will attain this spring. Two large Detroit automobile plants are still operating at greatly reduced capacity, but the output of other Michigan car builders so far this year is reported to be slightly in excess of the corresponding period a year ago. A Detroit tractor plant is reported to have increased its production to 525 tractors per day. Automobile manufacturers are not making contracts for the second quarter, but are placing frequent orders for steel to keep a steady flow of material into their plants.

Steel bars are moving in fairly heavy volume. Plate orders are fair. A pipe line for Boston taken by the Biggs Boiler Works, Akron, will require 1400 tons of plates, which has not been placed. Structural material is in fair demand from manufacturing plants, but fabricators are not buying much material, as new building work is still rather light. Steel bars are firmly held at 1.90c., Pittsburgh, by outside mills. However, a local producer who is holding to 1.90c., Cleveland, on most business is going to 1.80c. in some cases. Plates, which have been recently holding well at 1.90c., Pittsburgh, in this territory, show an easier tone with a quotation of 1.85c. appearing for good lots. Structural material is firm at 1.90c., Pittsburgh.

**Pig Iron.**—Sales again declined the past week. However, Cleveland interests took orders for 21,000 tons,

#### Warehouse Prices, f.o.b. Cleveland

	Base per lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c. to 3.00c.
Reinforcing steel bars	3.65c.
Cold-finished rounds and hexagons	4.15c.
Cold-finished flats and squares	3.65c.
Hoops and bands	3.65c.
Cold-rolled strip	5.95c.
Black sheets (No. 24)	3.65c.
Galvanized sheets (No. 24)	4.50c.
Blue annealed sheets (No. 10)	3.25c.
No. 9 annealed wire, per 100 lb.	\$2.90
No. 9 galvanized wire, per 100 lb.	3.35
Common wire nails, base, per keg	2.90

\*Net base, including boxing and cutting to length.

as compared with a total of 35,000 tons for the previous week. The buying movement for the second quarter seems about over in northern Ohio, but there is still some activity in the Michigan and Buffalo territories. However, inquiry is light as compared with the previous weeks. The amount of iron purchased by some of the foundries when prices were close to bottom indicates that these bought in excess of their expected requirements and will carry iron over to the third quarter. Shipping orders are heavy, and several producers will have shipped more iron than they made during March. The automotive industry is melting a large amount of pig iron and is specifying heavily for April shipment. Radiator and steam pump manufacturers in Michigan are reported to be operating at maximum capacity. The market has a firm tone, with furnace prices holding to recent levels. For outside shipment \$18.50 now seems to be firmly established as the minimum Cleveland furnace price on foundry and malleable iron, and \$19, furnace, is being quoted for delivery to some points in the central and western parts of the State. One producer reports small-lot sales at \$18.75 to \$19, base, with full extras. However, some Cleveland iron in the hands of brokers can be bought at \$18.25 for outside shipment. For Cleveland delivery local furnaces continue to quote \$19.50, furnace. The Michigan price is unchanged at \$19.50, furnace. A 50c. a ton concession from the recent price has appeared on low phosphorus iron, due to a reported weakness in this grade in the East. A Valley producer has taken some business at \$27.50, furnace, for standard low phosphorus, although this furnace has been able to get \$28.50 where it has a freight advantage. Sales by this furnace include a 500-ton lot to a Detroit consumer. A Pittsburgh foundry inquired for 1000 tons and is understood to have placed this business with an eastern producer. Although a few inquiries have come out for that delivery, foundries seem in no hurry to place third quarter contracts and none of the furnaces has opened its books for that delivery.

*Prices per gross ton at Cleveland:*

N'th'n No. 2 fdy., sil. 1.75 to 2.25	\$20.00
Southern fdy., sil. 1.75 to 2.25...	24.00
Malleable .....	20.00
Ohio silvery, 8 per cent.....	31.50
Basic, Valley furnace .....	18.50
Standard low phos., Valley furn. \$27.50 to	28.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

**Iron Ore.**—Producers and consumers are marking time, and it is unlikely that prices for the season will be named within the next few days. However, one leading interest is reported to have named prices to the Ford company. Lake navigation will get an early start this year. Some of the independent shippers will start their boats about April 15, and the Pittsburgh Steamship Co. has scheduled its fleet to go into commission April 19.

**Semi-Finished Steel.**—A Cleveland mill has come out with quotations of \$34, Cleveland or Youngstown, for sheet bars and \$33.50 to \$34 for billets and slabs for the second quarter and April shipment, or the same prices that it has quoted recently. It has taken some business on that basis for April delivery and a few contracts for the quarter.

**Sheets.**—While the aggregate volume of business is good, blue annealed and galvanized sheets are moving rather slowly and the demand for black sheets is largely for the better grades. The demand for automobile body sheets is keeping the mills well filled. Prices show little change. High finished sheets are holding quite firm, but prices are still weak on common black sheets, especially on the heavier gages. Some second quarter business in black sheets has been placed by Cleveland barrel manufacturers at 2.70c., Pittsburgh. For other consumers 2.75c., Pittsburgh, is a rather common quotation, although some sales are being made up to 2.90c. On blue annealed sheets 2.20c., Ohio mill, is rather commonly quoted, and the market does not seem firm at the price. Galvanized sheets are moving slowly for this season of the year, and prices are irregular. While the usual quotation is 3.75c., Ohio mill, this can probably be shaded \$2 a ton.

**Strip Steel.**—While concessions from 3c., Cleveland, on cold-rolled strip steel are reported in Detroit, most

mills are holding to that price but are not getting much business, as most consumers are covered at the lower prices recently prevailing. Mills have good order books because of the good demand from the automotive industry. Some attempt is being made to buy hot-rolled strip steel below the regular quoted prices, but these seem to be well maintained.

**Reinforcing Bars.**—With two awards of 850 tons to a Cleveland mill and some new inquiry, the market shows more life than for some time. Prices are rather irregular. Included in prospective work is a warehouse for the May Co., Cleveland, which it is estimated will require 1000 tons. Open quotations on rail steel bars are 1.75c. to 1.80c., mill.

**Warehouse Business.**—Jobbers' sales on the whole are fair. Steel bars and plates are moving well, but structural material is in light demand and sheets are not very active. Prices are being well maintained.

**Coke.**—There is little life to the foundry coke market, although some second quarter contracts are being placed. The price range for standard Connellsburg brands is from \$4.25 to \$5.50 per ton, ovens.

**Bolts, Nuts and Rivets.**—Consumers are placing good orders against first quarter contracts for large bolts, which will advance an average of 3 to 5 per cent under the new prices effective April 1, but they are withholding specifications for small bolts, which will be lower. A fair number of second quarter contracts have been placed on the new price basis. Jobbers have not determined their resale discount, but some of the makers are naming 62½ per cent discount from the new list as their price to small-lot buyers. An important feature of the new rivet price lists is the making of Cleveland a basing point on large rivets. This is said to have resulted from a recent establishment by a local mill of a Cleveland basing point on steel bars. Sales will be made on either a Cleveland or Pittsburgh base, whichever carries the lowest freight rate to the consuming plant. Some second quarter contracts have been taken at the new base price of \$2.75.

**Old Material.**—The flurry caused by the recent purchase of 10,000 to 15,000 tons of heavy melting steel by a Cleveland mill has subsided, and the market does not show the strength on this grade that it did last week. Dealers bought some No. 1 heavy melting steel at \$15.75 against this purchase, but they are now well covered and are not offering above \$15.50, although no sales are reported at that price. The same consumer has purchased a small tonnage of compressed sheet steel, which has advanced 25c. Another Cleveland mill has held up shipments on heavy melting steel. With the automotive industry again going at good rate, the scrap offerings of Detroit car builders for April will be large. Lists already sent out include 2400 tons offered by the Cadillac Motor Car Co. and 3200 tons by the Chrysler Corporation.

*Prices per gross ton, delivered consumers' yards:*

*Basic Open-Hearth Grades*

No. 1 heavy melting steel.....	\$15.25 to \$15.50
No. 2 heavy melting steel.....	14.25 to 14.50
Compressed sheet steel .....	14.00 to 14.50
Light bundled sheet stampings .....	12.00 to 12.50
Drop forge flashings .....	14.00 to 14.50
Machine shop turnings .....	9.00 to 9.50
No. 1 railroad wrought .....	11.50 to 12.00
No. 2 railroad wrought .....	14.00 to 14.50
No. 1 busheling .....	12.50 to 12.75
Pipes and flues .....	10.00 to 10.50
Steel axle turnings .....	12.50 to 13.00

*Acid Open-Hearth Grades*

Low phosphorus forging crops...	16.50 to 17.00
Low phosphorus, billet bloom and slab crops .....	18.00 to 18.50
Low phosphorus sheet bar crops .....	16.50 to 17.00
Low phosphorus billet scrap .....	16.00 to 16.50

*Blast Furnace Grades*

Cast iron borings .....	11.50 to 11.75
Mixed borings and short turnings .....	11.50 to 11.75
No. 2 busheling .....	11.50 to 11.75

*Cupola Grades*

No. 1 cast .....	16.00 to 16.50
Railroad grate bars .....	12.00 to 12.50
Stove plate .....	12.00 to 12.50

*Miscellaneous*

Railroad malleable .....	15.50 to 16.00
Rails for rolling .....	16.25 to 16.50

Pilling & Co., Inc., has been appointed exclusive agent for the territory tributary to the Atlantic Coast for the sale of Avesta Swedish charcoal pig iron, produced by A. Johnson & Co., Stockholm, Sweden.

## Philadelphia

### All Markets Dull on Eve of Strike in Bituminous Coal Fields

PHILADELPHIA, March 29.—On the eve of a strike of miners in the bituminous coal fields, the steel, pig iron and scrap markets remain unaffected. Efforts of the selling departments of some of the steel companies to convince buyers that higher prices for finished steel may be expected if the strike assumes sizable proportions have apparently fallen on deaf ears, for there has been no stimulation in buying. The demand for a few products, notably structural shapes, has increased slightly due to normal expansion of seasonal requirements, but some other lines, particularly sheets, have been noticeably dull during the week. The situation in sheets is being watched with interest by both sellers and buyers. The recently announced advances in prices, to be effective on second quarter business, have not taken hold in the way that was expected, and even sellers express doubt as to whether the market level can be pushed upward in view of the willingness of some mills to take business at lower levels. Sales within the week have been at 2.20c. for blue annealed sheets, 2.80c. for black and 3.65c. for galvanized, Pittsburgh base, and contracting for second quarter at any price has been at a minimum. Bids to be opened this week by the Pennsylvania Railroad on sheets, as well as on other products, will disclose the attitude of the mills.

**Pig Iron.**—Sales of foundry iron in this district have been on a par with the output of the active furnaces, which means that most of them are continuing to keep about two to three months' business ahead of them. The hand-to-mouth buying policy which has prevailed in steel for some time is being more and more adopted by pig iron buyers, except that they are making known their requirements a little further ahead than in steel. This policy has seemingly been unaffected by any expectation of a tighter pig iron market due to the soft coal strike on April 1, there being no sign as yet that the output of iron or the cost of producing it will be changed within the immediate future. A situation more apt to influence the local market is the cutting down of pig iron production in this district from other causes. The Robesonia furnace, which has been making foundry and low phosphorus iron, will go out of blast early in April, and the Alan Wood Iron & Steel Co. will shortly put out a furnace for relining. The Colonial Iron Co.'s furnace at Riddlesburg will go in, however, and this will partially offset the other loss of production. Prices for iron continue unchanged, being \$21, furnace, for the base grade of foundry iron, \$25 for low phosphorus iron and about \$21, delivered, for basic.

*Prices per gross ton at Philadelphia:*

East. Pa. No. 2 plain, 1.75 to 2.25	
sl. ....	\$21.76 to \$22.26
East. Pa. No. 2X, 2.25 to 2.75	22.26 to 22.76
East. Pa. No. 1X .....	22.76 to 23.26
Basic (delivered eastern Pa.) .....	20.75 to 21.25
Gray forge .....	21.00 to 21.50
Malleable .....	22.50 to 23.00
Standard low phos. (f.o.b. New York State furnace) .....	25.00
Copper bearing low phos. (f.o.b. furnace) .....	25.00 to 26.00
Virginia No. 2 plain, 1.75 to 2.25	26.17 to 26.67
sl. ....	26.17 to 27.17

Prices, except on low phosphorus, are delivered Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$5.17 from Virginia furnaces.

**Ferromanganese.**—With consumers getting ample shipments against contracts, there is very little new buying of ferromanganese. Sales are limited to occasional carload lots. Quotations remain at \$100, seaboard, for either domestic or foreign.

**Plates.**—Day-to-day orders for plates are sufficient to give Eastern mills about the same rate of operation they have been maintaining since the first of the year. Orders are chiefly for small lots, with quick shipment the usual request. On miscellaneous business the mills seem to have no difficulty in obtaining 1.90c., Pittsburgh, the only exceptions being the larger tonnages to special buyers.

**Structural Shapes.**—Fabricators and other users of structural shapes are specifying more freely, and mill rollings are better filled than at any time this year. The amount of fabricated steel work in immediate prospect in this district is not large, however, and competition for work by structural shops continues keen. Mill prices show no strength. Ordinary lots are being sold at 1.80c. to 1.90c., Pittsburgh, but the larger buyers have little difficulty in obtaining concessions of \$2 or \$3 a ton.

**Bars.**—No marked increase in the volume of steel bar orders and specifications has developed, but the tone of the market is slightly better. One distributor of concrete reinforcing bars reports that March tonnage was larger than that of either January or February. Quotations are uniformly 1.90c., Pittsburgh.

**Sheets.**—So little business in sheets for second quarter has been put on mill books at the recently announced prices of 2.25c. for blue annealed, 2.90c. for black and 3.75c. for galvanized that there is a good deal of question as to what success the producers will have in putting this higher level actually in effect. Some mills are adhering to these quotations, but they are the ones which have a fair amount of tonnage on their books. Other mills, which need orders for immediate rolling, are accepting business at 2.20c. for blue annealed, 2.80c. for black and 3.65c. for galvanized.

**Imports.**—More than 2000 tons of foreign steel came in at Philadelphia last week as follows: Steel blooms from France, 1088 tons; steel blooms from Sweden, 17 tons; steel bars, 162 tons from Belgium, 32 tons from the Netherlands and 4 tons from Sweden; structural steel, 689 tons from Belgium; hoop steel, 14 tons from Great Britain; strip steel, 103 tons from Belgium and 50 tons from Germany; wire rods, 10 tons from Belgium. Other imports were: 7116 tons of iron ore from Sweden; 9639 tons of manganese ore from British West Africa; 100 tons of pig iron from Belgium, 150 tons from the Netherlands and 48 tons from Sweden; 22 tons of ferroalloys from Switzerland.

**Old Material.**—Both steel plant and foundry grades of cast scrap have gained in strength, but otherwise the scrap market remains in about the same position as in recent weeks. There is very little buying of heavy melting steel by mills. From one consumer, \$14.50 is obtainable for this grade, but brokers are unwilling to sell at less than \$15. Low phosphorus scrap is slightly lower at \$19 to \$19.50, delivered.

*Prices per gross ton, delivered consumers' yards, Philadelphia district:*

No. 1 heavy melting steel .....	\$14.50 to \$15.00
Scrap T rails .....	14.00 to 14.50
No. 2 heavy melting steel .....	12.00 to 13.50
No. 1 railroad wrought .....	17.00 to 17.25
Bundled sheets (for steel works) .....	12.00
Machining shop turnings (for steel works) .....	12.00
Heavy axle turnings (or equivalent) .....	13.50 to 14.00
Cast borings (for steel works and rolling mill) .....	12.00 to 13.00
Heavy breakable cast (for steel works) .....	15.50 to 16.00
Railroad grate bars .....	13.00
Stove plate (for steel works) .....	13.00
No. 1 low phos. heavy, 0.04 per cent and under .....	19.00 to 19.50
Couplers and knuckles .....	17.00 to 17.50
Rolled steel wheels .....	17.00 to 17.50
No. 1 blast furnace scrap .....	10.50 to 11.00
Machining shop turnings (for rolling mill) .....	12.00 to 12.50
Wrought iron and soft steel pipes and tubes (new specifications) .....	13.50 to 14.00
Shafting .....	18.50 to 19.00
Steel axles .....	21.00 to 22.00
No. 1 forge fire .....	12.00 to 12.50
Steel rails for rolling .....	16.50 to 17.00
Cast iron carwheels .....	16.00 to 16.50
No. 1 cast .....	17.00 to 17.50
Cast borings (for chemical plant) .....	15.00 to 16.50

### Soviet Russia's Machinery Purchases

The Amtorg Trading Corporation, 165 Broadway, New York, announces that total imports of machinery into the Soviet Union during the Soviet fiscal year 1925-26 amounted to \$72,701,000, compared with \$47,627,000 for 1924-25. During the same period production of industrial machinery in the Soviet Union increased 40 per cent, while output of agricultural machinery increased 92 per cent. Of the total imports in 1925-26, about \$15,000,000 worth came from the United States.

## San Francisco

### Total of 13,750 Tons of Plates Pending— 800 Tons of Belgian Steel Arrives

SAN FRANCISCO, March 26 (*By Air Mail*).—While there has been a lull in buying in nearly all departments of the market during the past week, plans are being prepared on several projects that will take substantial quantities of steel. Notable among these is a project to store 1,200,000 bbl. of oil for the Pan-American Petroleum & Transport Co., Los Angeles, which will call for 4000 to 5000 tons of plates. No date has yet been set for bids. A gas holder of 10,000,000 cu. ft. capacity at Long Beach, Cal., will take 5000 tons of plates, instead of 3500 tons as originally reported. Bids will be taken April 2. Pending jobs call for a total of 13,750 tons of plates. During the past 10 days a shipment of 800 tons of Belgian steel arrived at this port. While most of this tonnage is bars, part of it is made up of small structural shapes.

**Pig Iron.**—Little of importance has developed during the week in this department of the market. Bookings for second quarter deliveries of Utah iron are understood to be substantial. Quotations are unchanged.

*Prices per gross ton at San Francisco:*

*Utah basic	\$25.00 to \$26.00
*Utah foundry, sill. 2.75 to 3.25	25.00 to 26.00
**Indian foundry, sill. 2.75 to 3.25	25.00
**German foundry, sill. 2.75 to 3.25	24.25

\*Delivered San Francisco.

\*\*Duty paid, f.o.b. cars San Francisco.

**Shapes.**—Lettings of fabricated steel for the week total 500 tons; fresh inquiries call for about 685 tons. The largest individual award of the week, 200 tons for a bank building at San Jose, Cal., was taken by the Schrader Iron Works, San Francisco. The Golden Gate Iron Works took a total of 300 tons for three apartment houses in San Francisco. Bids have closed on the largest inquiry of the week, 525 tons for an office building in San Francisco. Eastern mills quote plain material at 2.35c., c.i.f. Coast ports.

**Plates.**—Aside from the plate tonnage given above, it is understood that a large public utility corporation in southern California will come into the market in June for about 8000 tons for a proposed penstock, and that the East Bay Municipal Utility District, Oakland, Cal., will call for bids in the near future on about 1500 tons. The Marin County Municipal Utility District, San Rafael, Cal., will take bids April 19 on 300 tons for tank work. Eastern mills are now quoting plates at 2.30c., c.i.f. Coast ports, but it is understood that 2.25c. is still obtainable on a desirable tonnage.

**Bars.**—Bids are being taken on about 3100 tons of reinforcing bars for the Glendale-Hyperion viaduct in Los Angeles. In San Pedro, Cal., an unnamed jobber took 510 tons for a school building, and in Santa Ana, Cal., 103 tons has been placed for road work. There has been little buying of concrete bars in San Francisco during the week. Small-tonnage jobs have also been small in number. Local reinforcing bar jobbers quote as follows: 2.85c., base, per lb., on lots of 200 tons, and 3.10c., base, on less-than-carload lots.

**Cast Iron Pipe.**—Lettings of the week include the following: The United States Cast Iron Pipe & Foundry Co. took 435 tons of 12 and 16-in. De Lavaud pipe for Tacoma, Wash.; 280 tons of 18-in. De Lavaud pipe for La Grande, Ore., and 111 tons of 4 to 10-in. centrifugal pipe for Pullman, Wash. B. Nicoll & Co. were awarded 335 tons of 6 and 8-in. Class D pipe by Barnes City, Cal. Buckley, Wash., placed 377 tons of 8, 10 and 12-

#### Warehouse Prices, f.o.b. San Francisco

Base per Lb.

Plates and structural shapes	3.00c.
Soft steel bars	3.00c.
Small angles, $\frac{1}{4}$ -in. and over	3.00c.
Small angles, under $\frac{1}{4}$ -in.	3.40c.
Small channels and tees, $\frac{3}{4}$ -in. to $2\frac{1}{4}$ -in.	3.60c.
Spring steel, $\frac{1}{4}$ -in. and thicker	5.00c.
Black sheets (No. 24)	4.70c.
Common wire nails, base per kg.	\$3.75
Cement coated nails, 100-lb. keg	3.75
Blue annealed sheets (No. 10)	3.75c.
Galvanized sheets (No. 24)	5.25c.

in. Class B pipe with unnamed makers, and Medford, Ore., let 71 tons of 6 and 8-in. centrifugal pipe to an unnamed company. Los Banos, Cal., will take bids April 6 on 182 tons of 4 and 6-in. Class B pipe; Los Angeles will open bids March 29 on 1425 tons of 8-in. Class B pipe, and on April 1 it will take bids on 481 tons required under Specification 804-A. Benson, Ariz., will open bids April 1 on 223 tons of 4 and 6-in. pipe. Bids will be called for soon on 462 tons of 20-in. Class B pipe by Klamath Falls, Ore., and Mountain View, Cal., is expected to come into the market soon for 143 tons of 4, 6 and 8-in. Class B pipe. Quotations are unchanged at \$44 to \$48 base, f.o.b. dock, San Francisco.

**Steel Pipe.**—The Standard Oil Co. of California, San Francisco, has placed 430 tons of 2 to 8-in. line pipe with an unnamed company.

**Rails and Track Supplies.**—The United States Steel Products Co. is low bidder on 1800 tons of 70, 75 and 80-lb. rails for the Los Angeles County Flood Control District, Los Angeles. The low bid is understood to be \$31.12 per gross ton. G. Weisbaum, Los Angeles, is understood to have bid \$33.50 per gross ton on relaying rails. In Oakland, Cal., the Key System Transit Co. will spend approximately \$1,250,000 this year for track construction, new equipment and safety devices.

**Warehouse Business.**—Sales during the week have been confined to the routine requirements of local firms, who are adhering to a policy of hand-to-mouth buying. Quotations are unchanged.

**Coke.**—Most of the local users are well covered for their second quarter needs. Sales during the week have been small. Importers quote on specific inquiries only.

## Birmingham

### Reduction of Pig Iron Output Looked for— Steel Production Undiminished

BIRMINGHAM, March 29.—Although improved conditions are reported by some melters of pig iron and furnaces are soliciting business for second quarter at \$18, Birmingham, for No. 2 foundry, hand-to-mouth buying continues to be the rule. It is intimated that pig iron output may be reduced shortly. Such action may be delayed, however, by the fact that surplus stocks on furnace yards are low and deliveries against present obligations will not be completed for some time. While the larger melters of iron have laid up some stocks of finished product, it is believed that much of this accumulation will be disposed of soon. Iron production in Alabama during March will compare favorably, it is now estimated, with some of the larger monthly totals last year, and output for the first quarter will exceed that for the corresponding period in 1926.

*Prices per gross ton, f.o.b. Birmingham district Furnaces:*

No. 2 foundry, 1.75 to 2.25 sill	\$18.00 to \$19.00
No. 1 foundry, 2.25 to 2.75 sill	18.50 to 19.50
Basic	18.00
Charcoal, warm blast	29.00

**Rolled Steel.**—Mill operations are little short of capacity, and surplus stocks of steel are light. Mill backlog are large, and more business is in sight. Rails and track fastenings are being produced in quantity. Demand for plates and for wire and nails has shown improvement after a temporary lull. Cotton ties are now being produced by the Tennessee Company, and expectations are that despite the poor cotton market, there will be heavy requirements. Steel prices remain the same as for the past few weeks.

**Cast Iron Pipe.**—After passing through several dull weeks, the pressure pipe market is more active. Much pipe is on hand awaiting instructions as to shipment. Prices are unchanged at \$36 to \$37, Birmingham, for 6-in. and larger sizes. Soil pipe and fittings are not in active demand.

**Coke.**—The operations of by-product coke plants remain on a satisfactory basis and prices for foundry coke are unchanged at \$5.50 per net ton, Birmingham, with \$6 asked for immediate deliveries or for beehive coke. Independent producers have no coke in stock.

Progress is noted in the construction of 49 additional ovens by the Alabama By-Products Corporation. The 49 will have a producing capacity equal to that of the company's present 100 ovens. The Tennessee Coal, Iron & Railroad Co. is adding 63 ovens to its large by-product plant also.

**Old Material.**—There continue to be steady deliveries of heavy melting steel and No. 1 cast, but the market is quiet so far as new purchasing is concerned. Prices are still weak.

*Prices per gross ton, delivered Birmingham district consumers' yards:*

Heavy melting steel	\$12.00 to \$12.25
Scrap steel rails	12.50 to 13.00
Short shoveling turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Stove plate	13.00 to 14.00
Steel axles	16.00 to 17.00
Iron axles	16.00 to 17.00
No. 1 railroad wrought	11.00 to 12.00
Rails for rolling	15.00 to 16.00
No. 1 cast	15.00 to 16.00
Tramcar wheels	15.00 to 16.00
Cast iron carwheels	14.00 to 15.00
Cast iron borings, chemical	13.00 to 14.00

## Seattle

### Steel Demand Improves—Low Prices Named on Foreign Steel and Pig Iron

SEATTLE, March 25 (By Air Mail).—New inquiry for steel products is showing some betterment, while prices are stronger than at any time this year. The dip in prices that occurred late in February and early in March has almost entirely disappeared. Most Eastern mills are now adhering firmly to 2.35c. Seattle, on shapes and bars, while one seller of plates is holding for the same price. Two Eastern mills, however, will sell at 2.25c. for desirable tonnage and for early shipment.

Foreign mills, especially German, are seeking business very actively in this market and are making prices considerably under those quoted by Eastern mills. There is a scarcity of bottoms at present, and this is holding up some foreign shipments that otherwise would have come into this district some time ago. Belgian steel bars have been quoted as low as 1.90c., delivered Seattle.

The local building trades are active, and it is estimated that fully \$10,000,000 worth of work is under way, with some large contracts pending. Four or five very large pulp and paper mills are being figured on.

**Pig Iron.**—Sales are few and are confined almost entirely to small lots. Offers of foreign iron are being made in this market at prices considerably lower than are being quoted for domestic. The market on Utah basic and foundry iron remains at about \$25 per gross ton, delivered Seattle.

**Shapes.**—New inquiry is active and a fair amount of structural work is being placed, although there is some complaint about low prices being quoted on fabricated steel. The Puget Sound Bridge & Dredging Co., which has taken the contract for 1060 tons for a gymnasium at the University of Washington, has sublet the fabricating to the Wallace Bridge & Structural Steel Co. Bids go in shortly on 600 tons for a bascule bridge at Hoquiam, Wash. Structural shapes are firm at 2.35c., delivered Seattle.

**Plates.**—The local market is very quiet, and no large jobs are in sight. The city of Seattle is making plans for local work, which, if they go through, will take a considerable tonnage in plates. Prices are firmer than for some time. Mill prices on large lots are 2.25c. and on small lots, 2.30c. per lb., delivered Seattle.

**Sheets.**—While prices on sheets are low, they are firmer now than for some time, and it is believed that bottom has been reached. New demand is fair for galvanized, but for black and annealed is very dull. In fact, the local market on the last two grades is very restricted. Mill prices are: No. 24 galvanized, 4.25c.; No. 24 black, 3.35c., and No. 10 blue annealed, 2.75c., f.o.b. Seattle. It is possible that one or two Eastern mills might shade these prices not more than \$1 per ton.

**Bars.**—The demand for reinforcing bars is active,

there being some large buildings under way in Seattle in which considerable steel is being used, most of which is being furnished by the local Pacific Coast Steel Co. Mill prices on merchant steel bars and reinforcing bars are 2.35c., delivered to consumers.

**Hoops and Bands.**—The local market on bands is more active than on hoops. Prices are fairly firm. For large lots, hoops and bands are held at 2.90c. per lb., delivered Seattle.

**Wire Products.**—New business is light, but demand for fence wire is expected to be more active shortly. Competition between California makers and Eastern mills is reported to be severe. Wire nails in carload lots are bringing \$3.20, base, per keg, while small lots are quoted at \$3.30, base, per keg, f.o.b. Seattle.

**Old Material.**—The local market is quiet, but dealers report a very active demand for scrap rails for shipment to Japan. Bottoms are very scarce, and it is said that none can be obtained before June or later. Prices on local scrap show no change, but not enough material is being sold to determine the actual market, which is purely nominal. The ruling market on miscellaneous scrap is \$9 per net ton; on heavy steel scrap, \$11 per net ton; on cast iron scrap, \$15 per net ton, and on old rails for remelting, \$13 per gross ton, all f.o.b. Seattle.

**Warehouse Business.**—Seattle jobbers report that more tonnage is moving out of their warehouses than at any time so far this year. A new price list recently issued by a local jobber shows a reduction of 15c. per 100 lb. on black sheets to 4.75c. per lb., 25c. per 100 lb. on galvanized to 5.50c. per lb., and the same on blue annealed to 4c., base.

### Warehouse Prices, f.o.b. Seattle

	Base per Lb.
Plates and structural shapes	3.00c.
Angles, bar sizes	3.00c.
Angles, structural	3.00c.
Tees, bar sizes	3.50c.
Tees, structural	3.25c.
Reinforcing bars	2.90c.
Hoops	5.00c.
Bands	4.00c.
Rivets, tank	50 per cent off list
Carriage bolts, all sizes	40 per cent off list
Machine bolts	45 per cent off list
Wire nails, base, per keg	\$3.20

## Toronto

### Active Buying of Pig Iron for Second Quarter—Scrap Demand Better

TORONTO, ONT., March 29.—Improvement in demand features the Canadian pig iron market. Sales of spot iron and contracts for second quarter have been numerous. Consumers are now anxious to cover for second quarter needs, and some are asking for quotations for third quarter. Blast furnace representatives are accepting orders up to the end of June but are turning down contracts for longer terms, except at slightly advanced prices. Much of the business now being closed comes unsolicited. Prospects are good for a brisk quarter because of the fact that many companies using pig iron are experiencing a good demand for their finished products and have recently increased their daily melt. Prices are firm but unchanged.

*Prices per gross ton:*

	Delivered Toronto
No. 1 foundry, sll. 2.25 to 2.75	\$24.10
No. 2 foundry, sll. 1.75 to 2.25	24.10
Malleable	24.10

*Delivered Montreal*

No. 1 foundry, sll. 2.25 to 2.75	26.50
No. 2 foundry, sll. 1.75 to 2.25	26.50
Malleable	26.50
Basic	25.50

*Imported Iron at Montreal Warehouse*

Summerlee	36.00
Carron	36.00

**Old Material.**—Demand for iron and steel scrap in the Canadian market continues to improve. The majority of consumers have allowed their yard holdings to run low and are now replenishing to meet immediate requirements. An increase in the operations of mills, foundries and other plants has had a stimulating effect

on the local scrap market, and while business is far from brisk, dealers are of the opinion that business during the second quarter will greatly exceed that of the three months just ended. While there has been no general revision in prices either in the Toronto or Montreal markets, the situation has a stronger undertone.

*Dealers' buying prices:*

	Toronto	Montreal
<i>Per Gross Ton</i>		
Heavy melting steel	\$10.50	\$9.00
Rails	11.00	10.00
No. 1 wrought	11.00	14.00
Machine shop turnings	7.00	7.50
Boiler plate	8.00	8.00
Heavy axle turnings	8.50	8.50
Cast borings	8.50	7.50
Steel turnings	8.00	8.00
Wrought pipe	6.00	6.00
Steel axles	16.00	17.00
Axes, wrought iron	18.00	19.00
<i>Per Net Ton</i>		
No. 1 machinery cast	16.00	18.00
Stove plate	10.00	13.00
Standard carwheels	14.00	16.00
Malleable scrap	14.00	14.00

## St. Louis

### Better Demand for Fencing and Roofing Material—Advances in Scrap

ST. LOUIS, March 29.—Sales of pig iron slowed up somewhat during the past weeks, following a buying movement which lasted several weeks, and the market is rather quiet, with prices unchanged. While most melters in the district are well covered in their requirements for second quarter, there is said to be considerable buying yet to be done for this period. Low prices of scrap in this market are believed to be causing some melters to postpone buying of pig iron. The Federal Reserve Bank of St. Louis reports that shipments of finished materials from mills, foundries and shops are still slightly in excess of new orders, but that the volume of new business placed currently is of fair proportions, with the result that unfilled orders are only slightly smaller than in the previous month. Prices are unchanged.

*Prices per gross ton at St. Louis:*

*No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	\$20.50 to \$21.00
Granite City, Ill.	
Northern No. 2 fdy., delivered	
St. Louis	22.16
Southern No. 2 fdy., del'd.	22.16
Northern malleable, delivered	22.16
Northern basic, delivered	22.16

\*Freight rates: 81c. from Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

**Coke.**—The market for domestic coke is increasingly quiet as the weather becomes warmer. Dealers are not inclined to store domestic sizes against a possible coal strike. However, buying of industrial grades in anticipation of the strike continues.

**Finished Iron and Steel.**—With more favorable weather for outdoor work has come an improvement in the demand for fencing, wire cloth, roofing material and other material consumed in the farming areas. Manufacturing consumers of steel products have not been stirred to make advance purchases that the impending coal strike had given cause to expect. Warehouse business is light, showing the effects of a decided drop in buying from the oil fields as the result

### Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and structural shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-finished rounds, shafting and screw stock	3.75c.
Black sheets (No. 24)	4.45c.
Galvanized sheets (No. 24)	5.25c.
Blue annealed sheets (No. 10)	3.60c.
Black corrugated sheets	4.65c.
Galvanized corrugated sheets	5.30c.
Structural rivets	3.65c.
Boiler rivets	3.85c.
<i>Per Cent Off List</i>	
Tank rivets, $\frac{1}{4}$ -in. and smaller	.70
Machine bolts	50 and 5
Carriage bolts	47 $\frac{1}{2}$
Lag screws	55 and 5
Hot-pressed nuts, square, blank or tapped	3.25c. off per lb.
Hot-pressed nuts, hexagons, blank or tapped	3.75c. off per lb.

of two declines in the price of oil, which halted field operations.

**Old Material.**—Heavy melting and shoveling steel and No. 2 railroad wrought are up 25c. a ton, with other grades unchanged. There is a better feeling in the market, although there is nothing to justify it except reports of a stronger and higher market in Chicago. However, there is no new buying by consumers in this district and there is none in immediate prospect. Railroad lists include: Chicago, Milwaukee & St. Paul, 7000 tons; Chicago, Burlington & Quincy, 4200 tons; Big Four lines, 3500 tons; Union Pacific, 2200 tons; Nickel Plate, 1200 tons; Mobile & Ohio, 900 tons; Cotton Belt, 650 tons.

*Prices f.o.b. dealers' yards and delivered St. Louis district consumers' yards:*

	Per Gross Ton
Heavy melting steel	\$12.25 to \$12.75
Heavy shoveling steel	12.25 to 12.75
Frogs, switches and guards cut apart	13.00 to 13.50
Steel rails less than 3 ft.	16.00 to 16.50
Iron rails	14.00 to 14.50
Heavy axle and tire turnings	9.50 to 10.00
Railroad springs	14.00 to 14.50
No. 1 locomotive tires	16.75 to 17.25
Rails for rolling	14.50 to 15.00
Relaying rails, 60 lb. and under	20.50 to 23.50
Relaying rails, 70 lb. and over	26.50 to 29.00
Cast iron carwheels	14.25 to 14.75
	Per Net Ton
Machine shop turnings	6.25 to 6.75
Bundled sheets	7.50 to 8.00
Cast iron borings	8.50 to 9.00
Steel angle bars	12.50 to 13.00
Steel car axles	17.25 to 17.75
Iron car axles	20.50 to 21.00
Wrought iron bars and transoms	17.50 to 18.00
No. 1 railroad wrought	10.75 to 11.25
No. 2 railroad wrought	10.75 to 11.25
No. 1 busheling	9.50 to 10.00
No. 1 machinery cast	16.00 to 16.50
No. 1 railroad cast	14.25 to 14.75
Railroad malleable	12.00 to 12.50

## Buffalo

### Pig Iron Advances—Marked Activity in Scrap—Concrete Bars in Demand

BUFFALO, March 29.—One of the furnace interests reports an aggregate inquiry for pig iron over the past week of about 13,000 tons. One of these inquiries was for 2000 tons of No. 2X foundry, which was placed at \$17.75, Buffalo, and another for 1000 tons of basic of the high manganese grade went at \$17. Among the other inquiries was one for 1500 tons of foundry and another for 1000 tons of foundry. The low price for local furnaces seems to be \$17.25, base. Most of the furnaces are quoting \$18 with full differentials. The differentials on the \$17.25 base are given as 50c. up for No. 2X and \$1.75 up for No. 1X. One interest which has sold nothing under \$18 at any time during the recent movement has not over 10,000 tons to dispose of between now and June, having materially reduced its stocks despite the low prices of competitors.

*Prices per gross ton, f.o.b. Buffalo furnace:*

No. 2 plain fdy., sil. 1.75 to 2.25	\$17.25 to \$18.00
No. 2X foundry, sil. 2.25 to 2.75	17.75 to 18.50
No. 1X foundry, sil. 2.75 to 3.25	19.00 to 19.50
Malleable, sil. up to 2.25	17.25 to 18.00
Basic	17.00 to 18.00
Lake Superior charcoal	27.28

**Finished Iron and Steel.**—Demand for rolled material keeps up, with mills operating around 70 to 75 per cent. Bars and shapes are firm at 2.165c. to 2.265c., Buffalo. Sheet demand continues good, with all finishes represented. Wire mills are operating well, with demand good. Reinforcing bar distributors are figuring a hospital addition to require 100 tons. The Victor store job previously estimated at 200 tons will require 500 tons. Bids go in for this job next week. The New

### Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and structural shapes	3.40c.
Soft steel bars	3.30c.
Cold-finished shapes	4.45c.
Rounds	3.95c.
Black sheets (No. 24)	4.30c.
Galvanized sheets (No. 24)	5.15c.
Blue annealed sheets (No. 10)	3.80c.
Common wire nails, base per keg	\$3.90
Black wire, base per 100 lb.	3.90

Process Corporation plant at Warren, Pa., requiring 100 tons, is to be placed this week. Several road mesh jobs have been let during the past 10 days. One of these required 150 tons of bars.

**Old Material.**—The market is retaining its strength, and there has been more activity in the past two weeks than for any like period during the past year. Recent purchases have greatly stimulated interest, and there are one or two additional inquiries for heavy melting steel. One of these inquiries is for approximately 2000 tons. The largest mill, which, as was stated last week, has been buying railroad steel at \$17.50 per gross ton, consuming yards, continues to offer dealers \$15.50. Sales of No. 1 machinery cast, stove plate and short steel rails have been made. Some small tonnages of low phosphorous scrap have also been placed.

*Prices per gross ton, f.o.b. Buffalo consumers' plants:*

**Basic Open-Hearth Grades**

No. 1 heavy melting steel	\$16.00 to \$16.50
No. 2 heavy melting steel	15.00 to 15.50
Scrap rails	16.00 to 16.50
Hydraulic compressed sheets	14.50 to 15.00
Hand-bundled sheets	11.00 to 11.50
Drop forge flashings	13.00 to 13.50
No. 1 busheling	15.00 to 15.50
Heavy steel axle turnings	14.00 to 14.50
Machine shop turnings	9.00 to 9.50

**Acid Open-Hearth Grades**

Railroad knuckles and couplers	17.50 to 18.00
Railroad coil and leaf springs	17.50 to 18.00
Rolled steel wheels	17.50 to 18.00
Low phosphorous billet and bloom ends	17.50 to 18.00

**Electric Furnace Grades**

Heavy steel axle turnings	14.00 to 14.50
Short shoveling steel turnings	11.50 to 12.00

**Blast Furnace Grades**

Short shoveling steel turnings	11.50 to 12.00
Short mixed borings and turnings	10.00 to 10.50
Cast iron borings	11.00 to 11.50
No. 2 busheling	13.00 to 13.50

**Rolling Mill Grades**

Steel car axles	17.00 to 17.50
No. 1 railroad wrought	13.00 to 13.50

**Cupola Grades**

No. 1 machinery cast	16.50 to 17.00
Stove plate	14.00 to 14.50
Locomotive grate bars	13.00 to 13.50
Steel rails, 3 ft. and under	18.00 to 18.50
Cast iron carwheels	15.00 to 16.00

**Malleable Grades**

Railroad	16.50 to 17.00
Agricultural	16.50 to 17.00
Industrial	16.50 to 17.00

## Cincinnati

### Active Demand for Silvery Iron—Sheet Market Is Steadier

CINCINNATI, March 29.—Sales of silvery iron have been the feature of the market during the past week, a consumer in Cleveland having taken upward of 1500 tons and a Michigan melter, 500 tons. Other orders for small quantities brought silvery bookings up to a total of about 3500 tons. Jackson County producers are shipping liberal tonnages on contract and are reported to have only a limited supply of some of the low grades of silvery. Prices are firm at \$28.50 for 8 per cent. In foundry iron the situation has changed little. Southern Ohio furnaces now admit that they are selling at \$19.50, base Ironton, although sales in the past week have been meager. Since Cleveland pro-

#### Warehouse Prices, f.o.b. Cincinnati

Base per Lb.

Plates and structural shapes	3.40c.
Bars, soft steel or iron	3.30c.
Reinforcing bars	2.30c.
Hoops	4.00c. to 4.25c.
Bands	2.95c.
Cold-finished rounds and hexagons	3.85c.
Squares	4.35c.
Open-hearth spring steel	4.75c. to 5.00c.
Black sheets (No. 24)	4.05c.
Galvanized sheets (No. 24)	4.90c.
Blue annealed sheets (No. 10)	3.60c.
Structural rivets	3.75c.
Small rivets	65 per cent off list
No. 9 annealed wire, per 100 lb.	\$2.00
Common wire nails, base per keg	2.95
Cement coated nails, base per 100 lb. keg	3.05
Chain, per 100 lb.	7.55

Net per 100 Ft.

Lap welded steel boiler tubes, 2-in.	\$18.00
4-in.	38.00
Seamless steel boiler tubes, 2-in.	19.00
4-in.	39.00

ducers are holding to \$18.50, base furnace, the price of Ironton foundry grades delivered in Cincinnati is the same as that of northern Ohio iron. Local brokers, who purchased Cleveland iron when it was \$17.50, base Cleveland, are competing strongly for current business at \$18.50. An order for 600 tons for a northern Indiana consumer is said to have been entered on that basis. In the malleable market outstanding sales consist of 1000 tons to a Michigan company and 800 tons to a melter in southern Ohio. The price remains at \$18.50 to \$19.50, base furnace, depending upon the point of delivery. Southern iron at \$18, base Birmingham, has been quiet so far as activities north of the Ohio River are concerned. Open inquiries are scarce, but a fair amount of iron is being sold under cover. A local dealer has sold 7000 tons of Southern iron to a consumer in this territory.

*Prices per gross ton, delivered Cincinnati:*

So. Ohio, fdy., sl. 1.75 to 2.25	\$21.39 to \$21.89
So. Ohio malleable	20.64 to 21.69
Alabama fdy., sl. 1.75 to 2.25	21.69
Alabama fdy., sl. 2.25 to 2.75	22.19
Tennessee fdy., sl. 1.75 to 2.25	21.69
Southern Ohio silvery, 8 per cent	30.39

Freight rates: \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

**Finished Material.**—Records for the first quarter show that specifications and orders have been on a par with those in 1926 and, in some cases, a substantial increase has been registered. The fact that bars and structural steel are selling on the present basis of 1.90c., base Pittsburgh, for delivery throughout the second quarter has militated against the placing of large tonnages in the closing days of March, buyers preferring instead to delay making purchases until they actually are in need of material. In the sheet market the price situation gradually is becoming clarified, and the majority of mills have enough business booked ahead to give them encouragement in their efforts to break away definitely from the low quotations that have persisted over the past two months. Three or four automobile manufacturers are specifying heavily against sheet contracts, but several others are buying against a curtailed program. Black sheets are selling at 2.85c. to 2.90c., base Pittsburgh, and galvanized sheets are bringing 3.75c. Blue annealed stock is firm at 2.20c. to 2.30c., base Pittsburgh. Demand for special grades of sheets has been active. Little change has occurred in wire goods. Common wire nails are still being delivered in Cincinnati at approximately \$2.72 per keg by independent river mills shipping by barge, but some makers are declining to accept orders at less than \$2.55, base Pittsburgh. In electrical wire competition has been particularly severe, and prices have been shaded as a result. Fabricators in this district are fairly well engaged, although few sizable jobs have been placed in recent weeks. Sales of cold-rolled steel have been in good volume because of the demand from automotive parts manufacturers.

**Warehouse Business.**—March has turned out to be a fairly good month for most jobbers, and several important companies report that total business during the first quarter paralleled that in the corresponding period in 1926, although others have suffered a decrease. Demand has been well distributed among all products. Common wire nails are being sold in Louisville at 10c. to 20c. a keg under the schedule of \$2.95 that prevails locally. Otherwise, prices are steady.

**Coke.**—With the date set for the beginning of the coal strike almost at hand there is no indication of an upward turn in the coke market. In fact, the usual drop in domestic grades is anticipated. While no formal announcement has been made, by-product coke companies are expected to reduce domestic egg to \$5 per net ton, f.o.b. ovens, or \$7.14, delivered Cincinnati, and walnut to \$4.50, a decrease of \$1.50 a ton. In Michigan the schedule for April delivery is reported to be \$7, delivered in Detroit, for egg, and \$6 for walnut, with both grades selling at \$6.50, Detroit ovens, for outside delivery. One company in the Portsmouth-Ashland district has informed the trade that its present price of \$9.52, delivered Cincinnati, on by-product foundry will be maintained during April. Other sellers, however, have not determined upon their quotations. Shipments of by-product foundry coke in March

showed a 10 per cent increase over those in February. Beehive coke is rather weak, and sales of foundry grades from the Wise County and New River districts have been only fair at best.

*Foundry coke prices per net ton, delivered Cincinnati: By-product coke, \$9.52 to \$9.64; Wise County coke, \$7.59 to \$8.09; New River coke, \$10.09 to \$10.59. Freight rates: \$2.14 from Ashland, Ky.; \$2.59 from Wise County and New River ovens.*

**Old Material.**—Steel plants in this territory are accepting contract shipments at a normal rate, but foundry consumers are buying only in small lots. Dealers believe that the market will gain considerable strength in the next month and therefore are willing to pay fairly good prices for many items.

*Dealers' buying prices, f.o.b. cars, Cincinnati:*

Per Gross Ton	
Heavy melting steel	\$13.00 to \$13.50
Scrap rails for melting	13.50 to 14.00
Short rails	17.50 to 18.00
Relaying rails	26.50 to 27.00
Rails for rolling	14.00 to 14.50
Old carwheels	13.00 to 13.50
No. 1 locomotive tires	16.50 to 17.00
Railroad malleable	14.50 to 15.00
Agricultural malleable	12.50 to 14.00
Loose sheet clippings	8.50 to 9.00
Champion bundled sheets	10.50 to 11.00
Per Net Ton	
Cast iron borings	8.00 to 8.50
Machine shop turnings	7.50 to 8.00
No. 1 machinery cast	16.00 to 17.00
No. 1 railroad cast	13.00 to 13.50
Iron axles	12.50 to 20.00
No. 1 railroad wrought	9.00 to 9.50
Pipes and flues	7.50 to 8.00
No. 1 busheling	9.00 to 9.50
Mixed borings	6.50 to 7.00
Burnt cast	7.00 to 7.50
Stove plate	9.00 to 9.50
Brake shoes	9.50 to 10.00

## Boston

### Pig Iron Market Quiet but Steadier —Steel Prices Flexible

BOSTON, March 29.—The pig iron market is quiet, with prices steadier. A Rhode Island foundry bought 600 tons of Buffalo malleable at \$17 a ton at furnace. Otherwise sales the past week were confined to small lots, with furnaces east of Buffalo taking most of the business. A western Pennsylvania furnace, however, sold several round tonnages for mixture purposes at prices \$1.50 a ton higher than those asked for Buffalo iron, and Alabama iron figured in several bookings at \$18 a ton, base furnace. The lowest price quoted on Buffalo iron is now \$17.50 a ton, base furnace, an advance of 25c. a ton for the week. Furnaces east of Buffalo are holding to \$18 a ton, base furnace. Some non-competitive inquiry for special irons for mixture purposes is reported, but there is no important open inquiry. New England foundries are well covered for the second quarter, and some of them, for third quarter.

*Prices of foundry iron per gross ton, delivered to most New England points:*

East. Penn., sll. 1.75 to 2.25	.... \$24.15 to \$24.65
East. Penn., sll. 2.25 to 2.75	.... 24.65 to 25.15
Buffalo, sll. 1.75 to 2.25	.... 22.16 to 22.91
Buffalo, sll. 2.25 to 2.75	.... 22.66 to 23.16
Virginia, sll. 1.75 to 2.25	.... 26.92 to 27.42
Virginia, sll. 2.25 to 2.75	.... 27.42 to 27.92
Alabama, sll. 1.75 to 2.25	.... 24.91 to 26.77
Alabama, sll. 2.25 to 2.75	.... 25.41 to 27.27

*Freight rates: \$4.91 from Buffalo, \$3.65 from eastern Pennsylvania, \$5.92 from Virginia, \$6.91 to \$8.77 from Alabama.*

**Finished Material.**—Average bookings in March by local representatives of mills are reported about 75 per cent of a normal month, notwithstanding the general report that business is dull. Buying is on a hand-to-mouth basis, and prices have been shaded on small lots. For instance, while bars are openly quoted at 1.90c. per lb., base Pittsburgh, 1.85c. can be done, and that statement applies to standard shapes as well. Possibly less than 1.85c. can be done on a round tonnage of plates.

**Sheets.**—The sheet market is unsettled. Some mills quote black sheets at 2.90c. per lb., base Pittsburgh, blue annealed at 2.25c., and galvanized at 3.75c. for April delivery. Other mills are taking business for April and May delivery at 2.80c. for black, 2.20c. for blue annealed, and 3.65c. for galvanized, and some of the smaller mills have contracted at these prices for

delivery into June. There is no free buying movement, bookings being a matter of solicitation, and users are by no means covered for second quarter.

**Cast Iron Pipe.**—Although individual tonnages involved are comparatively small, municipal buying of pipe is more active. Falmouth, Mass., has awarded 800 tons of 4, 6 and 8-in. pipe and fittings to the United States Cast Iron Pipe & Foundry Co., and Brookline, Mass., has given 235 tons to the same firm. R. D. Wood & Co. will furnish Everett, Mass., with its 1927 pipe requirements. Marion, Mass., has awarded 200 tons to a local company. Brockton, Mass., closed bids March 28 on 200 tons of 6 and 8-in. pipe. On the following day, Quincy, Mass., closed bids on 325 tons of 4 to 10-in. pipe. Foxboro, Mass., took tenders on 360 tons of 6-in. and Providence, R. I., on 800 tons of pipe and fittings. Taunton, Mass., closes bids March 31 on 500 tons of 8 and 12-in. pipe. Prices on small pipe of domestic manufacture hold firm, but those on large pipe are still subject to concessions. Quotations made openly are: 4-in., \$58.10 a ton, delivered common Boston freight rate points; 6 to 12-in., \$53.10 to \$54.10; larger pipe, \$52.10 to \$53.10. A \$5 differential is asked on Class A and gas pipe.

**Coke.**—While New England makers of by-product foundry coke shipped more fuel in March than in January, the difference was not very pronounced. There has been some stocking, but most foundries have specified against contracts only as fuel was required, the talk of a coal strike having little influence on the trade. In the event of a strike there is a possibility of New England ovens advancing fuel prices from the prevailing \$12.50 a ton delivered within a \$3.10 freight rate zone, but they will not commit themselves on this point. Both companies have liberal fuel supplies as the month closes.

**Old Material.**—Business is spotty. Some brokers report little material moving, and others, an increase in sales. Yard steel is moving to a Pennsylvania steel mill in fairly large tonnages at \$12 a ton, delivered, which figures back to about \$7.10, on cars shipping point. The top price reported on heavy melting steel is now \$10.65 a ton, on cars, contrasted with \$11 a week ago.

*Buying prices per gross ton, f.o.b. Boston rate shipping points:*

No. 1 heavy melting steel	.... \$10.50 to \$10.65
Scrap rails	.... 10.50 to 11.00
No. 1 railroad wrought	.... 12.00 to 12.50
No. 1 yard wrought	.... 11.00 to 11.50
Machine shop turnings	.... 6.75 to 7.00
Cast iron borings (steel works and rolling mill)	.... 6.85 to 7.50
Bundled skeleton, long	.... 6.85 to 7.50
Forged flashings	.... 7.50 to 8.00
Blast furnace borings and turnings	.... 6.00 to 6.50
Forged scrap	.... 7.00 to 7.50
Shafting	.... 14.50 to 15.00
Street car axles	.... 15.00 to 15.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	.... 8.50 to 9.00
Rails for rerolling	.... 11.50 to 12.00
Cast iron borings, chemical	.... 10.50 to 11.00

Prices per gross ton, delivered consumers' yards:	
Textile cast	.... \$17.00 to \$17.50
No. 1 machinery cast	.... 16.50 to 17.00
No. 2 machinery cast	.... 15.00 to 15.50
Stove plate	.... 12.50 to 13.00
Railroad malleable	.... 16.00 to 16.50

### Warehouse Prices, f.o.b. Boston

Base per Lb.

Plates	.... 3.365c.
Structural shapes—	
Angles and beams	.... 3.365c.
Tees	.... 3.465c.
Zees	.... 3.265c.
Soft steel bars and small shapes	.... 4.15c.
Flats, hot-rolled	.... 3.265c. to 3.54c.
Reinforcing bars	....
Iron bars—	
Refined	.... 3.265c.
Best refined	.... 4.60c.
Norway, rounds	.... 6.60c.
Norway, squares and flats	.... 7.10c.
Spring steel—	....
Open-hearth	.... 5.00c. to 10.00c.
Crucible	.... 12.00c.
Tire steel	.... 4.50c. to 4.75c.
Bands	.... 4.015c. to 5.00c.
Hoop steel	.... 5.50c. to 6.00c.
Cold rolled steel—	....
Rounds and hexagons	.... 4.05c.
Squares and flats	.... 4.55c.
Toe calk steel	.... 6.00c.

## FABRICATED STRUCTURAL STEEL

### Detroit Office Building Takes 10,000 Tons— 12,000 Tons Up for Coal Barges

A Detroit office building requiring 10,000 tons and a New York office building of 5500 tons swelled the week's structural steel awards to 33,000 tons. Inquiries ran close to 50,000 tons, including 12,000 tons for 75 coal barges for a Pittsburgh coal company and 9000 tons for subway work in New York. Oil tank work in California will call for 4500 to 5000 tons and a Toledo theater, 4200 tons. Awards follow:

BOSTON, 1600 tons, John Hancock Life Insurance Co. addition to Palmer Steel Co.

RUTLAND, Vt., 425 tons, building for Vermont Marble Co., to Lackawanna Steel Co.

NEW YORK, 1300 tons, 18-story loft building, 147-151 West Thirty-fifth Street, to A. E. Norton, Inc.

NEW YORK, 600 tons, office building, Ninth Avenue and Twentieth Street, to Post & McCord.

NEW YORK, 300 tons, apartment building, West End Avenue and Ninety-sixth Street, to Dreier Iron Works.

NEW YORK, 5500 tons, Harriman Building, 39 Broadway, to Levering & Garrigues Co.

NEW YORK, 650 tons, section 6, route 78, subways, to American Bridge Co.

NEW YORK, 2100 tons, destructor plant for city of New York on East Seventy-fourth Street, to McClintic-Marshall Co.

BROOKLYN, 350 tons, recreation pier, to an unnamed fabricator.

LONG ISLAND CITY, N. Y., 150 tons, building for Pennsylvania Railroad in Sunnyside yards, to Easton Structural Steel Co.

YONKERS, N. Y., 300 tons, addition to plant of Otis Elevator Co., to American Bridge Co.

KEARNY, N. J., 1800 tons, addition to plant of Western Electric Co., to McClintic-Marshall Co.

TRENTON, N. J., 275 tons, office building for John A. Roebling Sons Co., to Bethlehem Steel Co.

BUFFALO, 500 tons, Millard-Fillmore Hospital.

CLEVELAND, 200 tons, Alexander Hamilton junior high school.

CLEVELAND, 400 tons, warehouse for May Co.

ALTON, ILL., 5000 tons, highway bridges over Missouri and Mississippi Rivers.

TOLEDO, OHIO, 4200 tons, theater and office building for Lasky-Famous Players; general contract awarded to Thompson-Starrett Co.

PHILADELPHIA, 950 tons, Mt. St. Joseph College, Chestnut Hill.

CONNELLSVILLE, PA., 250 tons, building for West Penn Power Co., to an unnamed fabricator.

MCKEE ROCKS, PA., 200 tons, Roxian Theater, to Guibert Steel Co.

MORGANTOWN, W. VA., 100 tons, Woolworth Building, to Guibert Steel Co.

COLUMBUS, OHIO, 200 tons, apartment building, to Guibert Steel Co.

DETROIT, 100 tons, mill building, to Guibert Steel Co.

DETROIT, 10,000 tons, Penobscot Building, to American Bridge Co.

CHICAGO, INDIANAPOLIS & LOUISVILLE RAILWAY, 650 tons, general work, to Hetherington & Berner, Indianapolis.

HAMMOND, IND., 150 tons, building for the Mid-West Utility Corporation, to Hansell-Elcock Co., Chicago.

MINNEAPOLIS, 110 tons, building for the Ragen Bakery Co., to American Bridge Co.

CHICAGO, 500 tons, Garment Workers' building, to Midland Structural Steel Co., local.

CHICAGO, 110 tons, bridge for the Chicago, South Shore & South Bend Railway, to Hansell-Elcock Co., local.

CHICAGO, 180 tons, South Shore Theater, to Hansell-Elcock Co.

CHICAGO, 200 tons, substation for Commonwealth Edison Co., to Hansell-Elcock Co., Chicago.

CHICAGO, ROCK ISLAND & PACIFIC, 190 tons, bridges, to Hansell-Elcock Co.

WOOD RIVER, ILL., 100 tons, high school, to Mississippi Valley Structural Steel Co.

EAST ST. LOUIS, ILL., 250 tons, addition to First National Bank Building, to St. Louis Structural Steel Co.

SAN ANTONIO, TEX., 375 tons, three barges for J. DePuy to be used in constructing the Sabine jetties for the War Department, to Orange Car & Steel Co.

HOUSTON, TEX., 160 tons, two oil tanks, to Pittsburgh-Des Moines Steel Co.

SEATTLE, WASH., 1060 tons, gymnasium for University of Washington, to Puget Sound Bridge & Dredging Co.; fabricating sublet to Wallace Bridge & Structural Steel Co.

PORTLAND, 235 tons, penstock, Bull Run dam, to an unnamed fabricator.

SAN JOSE, CAL., 200 tons, building for the First National Bank, to Schrader Iron Works, San Francisco.

SAN FRANCISCO, 300 tons, three apartment houses, two on Clay Street and one on California Street, to Golden Gate Iron Works.

LOS ANGELES, 1500 tons, J. Ovlett Building, to Llewellyn Iron Works.

### Structural Projects Pending

Inquiries for fabricated steel work include the following:

RUTLAND, Vt., 300 tons, Colonial Marble Co. plant.

NEW YORK, 700 tons, public school No. 136.

NEW YORK, 375 tons, New York Riding Club on West Sixty-sixth Street.

NEW YORK, 9000 tons, for tunnel under East River; Patrick McGovern, Inc., general contractor.

MINNETTE, N. Y., 225 tons, addition to Columbia Mills.

NEW YORK CENTRAL RAILROAD, 650 tons, bridges.

WILKES-BARRE, PA., 800 tons, Miners' Bank Building.

PENNSYLVANIA RAILROAD, 300 tons, bridges.

BALTIMORE, 200 tons, warehouse and garage.

BALTIMORE & OHIO RAILROAD, 150 tons, bridge.

BUNCOMBE COUNTY, N. C., 1500 tons, court house building.

SOUTHERN RAILWAY, 350 tons, bridges.

FLORIDA EAST COAST RAILROAD, 425 tons, bridges.

PITTSBURGH, 12,000 tons, 75 coal barges for Pittsburgh Coal Co.

OHIO RIVER, 1100 tons, dam No. 41; bids close April 5 in United States Engineer office, Louisville, Ky.

CHICAGO, 800 tons, theater; Rapp & Rapp, architects.

TULSA, OKLA., 1500 to 2000 tons, office building for Waite-Phillips Petroleum Co.

OKLAHOMA CITY, 2500 tons, office building for Gas & Electric Public Utilities Co.

SAN RAFAEL, CAL., 300 tons, tank work for the Marin County Municipal Utility District; bids April 19.

OAKLAND, CAL., 160 tons, bridge across the Arroyo de la Laguna; bids taken by the County clerk, Alameda County, April 18.

SAN FRANCISCO, 525 tons, office building at Second and Howard Streets; bids in.

LOS ANGELES, 4000 to 5000 tons, tank work for the Pan-American Petroleum & Transport Co.; no date set for bids.

## RAILROAD EQUIPMENT

The Springfield & Worcester Street Railway, a subsidiary of the New York, New Haven & Hartford, has ordered 100 street railroad cars to cost approximately \$1,600,000. The order is divided equally between the Osgood-Bradley Car Co., Worcester, and the Wason Mfg. Co., Springfield, Mass.

The Eastern Massachusetts Street Railway Co. has ordered 25 street railroad cars from the Osgood-Bradley Car Co., Worcester, and 25 from the Wason Mfg. Co., Springfield, Mass., to cost \$750,000. The General Electric Co. will furnish the electrical equipment.

The New York Central has invited bids on 1000 70-ton hopper cars, 1000 70-ton and 500 55-ton gondola cars, 1000 all-steel box cars and 121 passenger cars of nine types.

The Pere Marquette is in the market for 1000 40-ton box cars, 250 70-ton hopper cars and 250 50-ton gondola cars.

The Consolidation Coal Co. is inquiring for 1150 mine cars.

The Union Tank Car Co. is in the market for 250 to 500 tank cars.

The Chicago & Illinois Midland has asked car builders for bids on the repairing of 250 gondola cars.

The Missouri Pacific has ordered 300 box car bodies from the American Car & Foundry Co.

The Boston & Maine is in the market for 35 locomotives. The Kansas City, Mexico & Orient is in the market for 15 locomotives.

The Reading is asking for prices on 25 locomotives.

The Atchison, Topeka & Santa Fe has ordered 150 caboose cars from the American Car & Foundry Co.

The Union Carbide Co. has ordered 4 steel hopper cars from the American Car & Foundry Co.

The Southern Pacific has ordered 40 passenger cars from the Bethlehem Steel Co. and 30 passenger cars from the Standard Steel Car Co.

The Canadian National Railways have ordered 20 caboose car underframes from the Pressed Steel Car Co.

The Standard Oil Co. of New Jersey has bought 10 steel box cars from the Pressed Steel Car Co.

The Detroit Edison Co. has ordered 4 gondola cars from the Pressed Steel Car Co.

The Union Railroad, a subsidiary of the United States Steel Corporation, has contracted with the Greenville Steel Car Co. for the repair of 670 hopper cars.

The Chicago Great Western is asking for prices on 5 caboose cars.

## NON-FERROUS METAL MARKETS

### The Week's Prices

Cents per Pound  
for  
Early Delivery

	Mar. 29	Mar. 28	Mar. 26	Mar. 25	Mar. 24	Mar. 23
Lake copper, New York...	13.37 1/2	13.37 1/2	13.37 1/2	13.37 1/2	13.45	13.45
Electrolytic copper, N. Y. ....	12.87 1/2	12.90	13.00	13.00	13.10	13.12 1/2
Straits tin spot, New York....	68.00	67.75	68.37 1/2	68.75	68.92 1/2	
Lead, New York.....	7.35	7.45	7.45	7.45	7.55	7.55
Lead, St. Louis.....	7.10	7.15	7.20	7.20	7.30	7.30
Zinc, New York.....	6.87 1/2	6.95	6.97 1/2	7.00	7.00	7.02 1/2
Zinc, St. Louis.....	6.52 1/2	6.60	6.62 1/2	6.65	6.65	6.67 1/2

\*Refinery quotation; delivered price 1/4c. higher.

NEW YORK, March 29.—All the markets are practically devoid of feature. Copper is a little weaker with demand still very light. There has been very little buying of tin and quotations are lower. Rather sharp reductions have been made in lead. Zinc prices have gradually eased off.

**Copper.**—There has been no improvement in demand and the stagnation, called attention to last week has continued for another week. Buyers, who continually watch the market very closely, are waiting until the last moment for lower prices. These have begun to appear and concessions during the week have amounted to about 1/4c. per lb. Electrolytic copper can be obtained today, Tuesday, at 13.37 1/2c., delivered in the Connecticut Valley, from one or two sellers, but not from all. There is enough, however, at this level to satisfy the poor demand. Foreign buying is also very light, but there has been no change in the official quotation of Copper Exporters, Inc., which continues at 13.65c. c.i.f. Hamburg. Undoubtedly curtailment at the mines is still going on and it is the belief in some quarters that buying must be resumed shortly by consumers, and that a stronger market is not far away. Lake copper is quoted at 13.37 1/2c., delivered.

**Tin.**—Outside of the heavy buying on Monday, March 21, when 500 tons changed hands, as noted in this paragraph last week, purchases have been very light, amounting to not more than 200 tons, bringing the total for the week to about 700 tons. Dealers

were again the principal buyers. One feature of the situation is the shrinkage of premium on spot and March metal. Yesterday spot Straits was sold at 67.75c. and April could have been bought at 67.50c., New York. Another interesting fact is that the New York price is considerably below the London parity. The present inactivity is due to the absence of demand and no pressure to sell. Spot Straits tin today was quoted at 68c., New York. London prices today were considerably below those of a week ago, with spot standard quoted at £307, future standard at £296 15s. and spot Straits at £318. The Singapore quotation today was £302 15s. Shipments of Banca tin so far this month have been 1206 tons and total arrivals have amounted to 5705 tons, with 3680 tons reported afloat.

**Lead.**—The hint in this paragraph last week that a declining rather than a rising market would be the probable outcome of conditions existing then, has been borne out. The leading interest made two reductions during the week in its New York contract price, the first on March 23 from 7.65c. to 7.55c., and the second on March 25 from 7.55c. to 7.45c., New York. The outside market went correspondingly lower and today is quoted at 7.10c. to 7.20c., St. Louis. In general the market is dull and the tone is rather easy.

**Later:** The American Smelting & Refining Co. reduced its quotation late today to 7.35c., New York.

**Zinc.**—It develops that a week ago 1000 tons of prime Western zinc was sold at 6.60c., St. Louis, when the market was generally at 6.65c. to 6.70c. This evidently was the incentive to further reduction, for since then the market has been gradually falling, because here and there there have been one or two sellers willing to make concessions. Today prime Western zinc has been offered at 6.52 1/2c., St. Louis, or 6.87 1/2c., New York, but not in large quantities, the demand not being heavy.

### Non-Ferrous Rolled Products

Mill prices on bronze, brass and copper products and on lead full sheets have not changed for nearly a month, and zinc sheets are still being quoted at the reduction of Jan. 10.

#### List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to  
75c. per 100 Lb. Allowed on Shipments  
of 500 Lb. or Over

##### Sheets—

High brass .....	18.37 1/2c.
Copper, hot rolled .....	22.00c.
Zinc .....	11.00c.
Lead (full sheets) .....	11.25c. to 11.50c.

##### Seamless Tubes—

High brass .....	23.25c.
Copper .....	24.00c.

##### Rods—

High brass .....	16.12 1/2c.
Naval brass .....	18.37 1/2c.

##### Wire—

Copper .....	15.37 1/2c.
High brass .....	18.37 1/2c.

##### Copper in Rolls.

Brass Rods .....	20.87 1/2c.
Brazed Brass Tubing .....	26.37 1/2c.

##### Aluminum Products in Ten Lots

The carload freight rate is allowed to destinations east of the Mississippi River and also allowed to St. Louis on shipments to destinations west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide .....	35.50c.
Tubes, base .....	45.00c.
Machine rods .....	34.00c.

### Metals from New York Warehouse

#### Delivered Prices per Lb.

Tin, Straits pig .....	70.25c. to 71.25c.
Tin, bar .....	72.25c. to 73.25c.
Copper, Lake .....	14.62 1/2c.
Copper, electrolytic .....	14.37 1/2c.
Copper, casting .....	13.87 1/2c.
Zinc, slab .....	7.62 1/2c. to 8.12 1/2c.
Lead, American pig .....	8.30c. to 8.80c.
Lead, bar .....	10.80c. to 11.30c.
Antimony, Asiatic .....	15.00c. to 15.50c.
Aluminum No. 1 ingot for remelting (guaranteed over 99 per cent pure) .....	29.00c. to 20.00c.
Babbitt metal, commercial grade .....	30.00c. to 40.00c.
Solder, 1/2 and 1/2 .....	42.50c. to 43.50c.

### Metals from Cleveland Warehouse

#### Delivered Prices per Lb.

Tin, Straits pig .....	74.50c.
Tin, bar .....	76.50c.
Copper, Lake .....	14.00c.
Copper, electrolytic .....	14.00c.
Copper, casting .....	13.25c.
Zinc, slab .....	8.25c.
Lead, American pig .....	8.25c.
Antimony, Asiatic .....	19.50c.
Lead, bar .....	10.25c.
Babbitt metal, medium grade .....	23.75c.
Babbitt metal, high grade .....	76.50c.
Solder, 1/2 and 1/2 .....	43.50c.

### Rolled Metals from New York or Cleveland Warehouse

#### Delivered Prices, Base per Lb.

##### Sheets—

High brass .....	18.37 1/2c. to 19.12 1/2c.
Copper, hot rolled .....	22.00c. to 23.00c.
Copper, cold rolled, 14 oz. and heavier .....	24.25c. to 25.25c.

##### Seamless Tubes—

Brass .....	23.25c. to 24.25c.
Copper .....	24.00c. to 25.00c.

Brazed Brass Tubes .....	26.12 1/2c. to 27.12 1/2c.
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Brass Rods .....	15.87 1/2c. to 16.87 1/2c.
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##### From New York Warehouse

#### Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks .....	12.75c. to 13.00c.
Zinc sheets, open .....	13.25c. to 13.50c.

Rolled Metals, f.o.b. Chicago Warehouse	
(Prices Cover Trucking to Customers' Doors in City Limits)	
<i>Sheets</i> —	Base per Lb.
High brass	18.37½c.
Copper, hot rolled	22.00c.
Copper, cold rolled, 14 oz. and heavier	24.25c.
Zinc	12.00c.
Lead, wide	10.25c.
<i>Seamless Tubes</i> —	
Brass	23.25c.
Copper	24.00c.
Brazed Brass Tubes	26.37½c.
Brass Rods	16.12½c.

**Antimony.**—Chaotic conditions in China have stiffened prices somewhat and spot Chinese metal is quoted at 14c., New York, with futures at 13.50c. to 13.75c.

**Nickel.**—Wholesale lots of ingot nickel are quoted unchanged at 35c., with shot nickel at 36c. and electrolytic nickel at 39c. per lb.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, is quoted at 26c. per lb., delivered.

#### Non-Ferrous Metals at Chicago

**MARCH 29.**—This market is quiet, and prices with the exception of tin and antimony are lower. Antimony has advanced as the result of curtailed shipments from China. The old metal market is without feature.

We quote in carload lots: Lake copper, 13.50c.; tin, 70.50c.; lead, 7.30c.; zinc, 6.75c.; in less than carload lots, antimony, 15c. On old metals we quote copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 9c.; red brass, 9c.; yellow brass, 7.25c.; lead pipe, 6.25c.; zinc, 4.25c.; pewter, No. 1, 35c.; tin foil, 43.50c.; block tin, 52c.; aluminum, 15c.; all being dealers' prices for less than carload lots.

### FOREIGN MARKETS QUIET

#### Some Inquiry from China—Tin Plate for Japan—American Sheets High

**NEW YORK, March 29.**—Japanese purchasing continues to be limited to the few large consumers in Japan. One of the outstanding inquiries at present is the 26,750 base boxes of oil can tin plate for the Nippon Oil Co., bids on which were opened in Tokio today. Despite the unsettled situation in China, exporters to that market continue to receive inquiries for small lots of material from merchants in Shanghai and the usual volume of business from Canton. Among recent purchases by Japanese consumers is 5 miles of 91-lb. high T-rails awarded by Nagoya municipality to Suzuki & Co. The order has not yet been placed with a mill, but it is expected that the business will go to a European maker. Financial conditions in Japan, which were highly unsatisfactory a few weeks ago, are considerably improved as a result of aid to second and third class banks provided by the government bank.

The sheet market in Japan is still weak. British mills, which have been quoting light gage black sheets as low as \$77 per ton and slightly less, c.i.f. Japan, have advanced the market to \$78 per ton, c.i.f. Japan. Affected by quotations of the Kawasaki Dockyard Co., however, the market in Japan continues still lower. Meanwhile, the price of American mills is unchanged at about \$81 per ton, c.i.f. Japan. As the season for increased consumption of light sheets is approaching, some strengthening of the market may develop before long.

Importers of European steel in New York report increased activity among American consumers, but business is still confined to small lots. Continental prices are strong and show an upward tendency with 1.75c. per lb., base, about the minimum obtainable on plain steel bars and some importers quoting 1.80c. per lb. and higher, depending upon the delivery available and the size of the order. There has been no action by the Treasury Department on the question of dumping of German steel, but in the meantime, importers not acting directly for a particular mill in Germany are diverting their business to Belgian and French markets.

#### Old Metals, Per Pound, New York

The buying prices represent what large dealers are paying for miscellaneous lots from the smaller accumulators, and the selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, heavy crucible	11.25c.	12.75c.
Copper, heavy and wire	11.00c.	12.00c.
Copper, light and bottoms	9.25c.	11.00c.
Brass, heavy	7.00c.	8.50c.
Brass, light	6.00c.	7.50c.
Heavy machine composition	8.50c.	10.00c.
No. 1 yellow brass turnings	7.75c.	8.625c.
No. 1 red brass or composition turnings	8.00c.	9.00c.
Lead, heavy	6.50c.	7.00c.
Lead, tea	4.50c.	5.25c.
Zinc	4.00c.	4.50c.
Sheet aluminum	15.00c.	17.00c.
Cast aluminum	15.00c.	17.00c.

### REINFORCING STEEL

#### Awards of 4700 Tons and Inquiries of 7200 Tons Reflect Enlarging Demand

A slightly increasing demand for concrete reinforcing bars is reflected in the week's totals of 4700 tons in awards and 7200 tons in new projects. A viaduct in California accounts for 3100 tons of the pending work. Awards follow:

BEDFORD, MASS., 400 tons, Veteran's Hospital, to Joseph T. Ryerson & Son, Inc., Boston.  
 BOSTON, 100 tons, surgical building, City Hospital, to Barker Steel Co.  
 NEW YORK, 750 tons, loft building, Varick and Vandam Streets, to McClintic-Marshall Co.  
 NEW YORK, 200 tons, incinerator and destructor plant, Seventy-third Street, to Fireproof Products Co.  
 BRENTWOOD, L. I., 200 tons, St. Joseph's Convent, to McClintic-Marshall Co.  
 PLAINFIELD, N. J., 200 tons, garage, to Concrete Steel Co.  
 BUFFALO, 150 tons, highway near Lockport, to a Buffalo company.  
 MEMPHIS, TENN., 105 tons, building for Swift & Co., to Kalman Steel Co.  
 CHICAGO, 200 tons, track elevation for the Chicago & Western Indiana Railroad, to Kalman Steel Co.  
 CHICAGO, 200 tons, building for the Amalgamated Clothing Workers, to Truscon Steel Co.  
 CHICAGO, 230 tons, apartment hotel on Everett Avenue, to Barton Spider-Web System, Inc.  
 SAN PEDRO, CAL., 510 tons, Dana Junior high school, to an unnamed jobber.  
 SANTA ANA, CAL., 103 tons, road work, to an unnamed jobber.  
 PHILADELPHIA, 250 tons, Green Lane bridge, to McClintic-Marshall Co.  
 CHICAGO, 180 tons of rail steel and billet bars, apartment building at 429 Roscoe Street, to Olney J. Dean & Co.  
 CHICAGO, 100 tons of rail steel and billet bars, apartment building at Ninety-fifth and Vanderpool Streets, to Olney J. Dean & Co.  
 ANN ARBOR, MICH., 500 tons, stadium for University of Michigan, to Bourne-Fuller Co.  
 FOSTORIA, OHIO, 350 tons, factory, National Carbon Co., to Bourne-Fuller Co.

#### Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

PROVIDENCE, R. I., 700 tons, waterworks.  
 BUFFALO, 500 tons, Victor store, previously reported as 200 tons; bids in next week.  
 GRAND RAPIDS, MICH., 200 tons, Star Transfer Line Warehouse; Colton Kretsch, architect.  
 CHICAGO, 750 tons, hotel for the Lynn-Hall Corporation; Eric Hall, architect.  
 CHICAGO, 130 tons, Birchwood apartment building; E. E. Behrens, architect.  
 SPRINGFIELD, ILL., 1000 to 1500 tons, road work for Illinois State Highway Commission.  
 MEMPHIS, TENN., 200 tons, junior high school, to Laclede Steel Co.  
 LITTLE ROCK, ARK., 200 tons, sewer, to Laclede Steel Co.  
 LOS ANGELES, 3100 tons, Glendale-Hyperion viaduct; bids in.  
 PHILADELPHIA, 250 tons, Mt. St. Joseph College, Chestnut Hill.  
 CAMDEN, N. J., 260 tons, building for Sears, Roebuck & Co.

## PERSONAL

P. L. Keiser, recently president Steel Plate Products Co., Pottstown, Pa., is president of the Pottstown Metal Products Co., Inc., Pottstown, recently incorporated to manufacture riveted and welded tanks and do general steel plating work. H. L. Christman, also lately with the Steel Plate Products Co., is secretary of the new company.

T. R. Talbot, who recently disposed of his interests in the Talbot-King Hardware Co., Kewanee, Ill., has been made assistant sales manager of Stanley G. Flagg & Co., Philadelphia.

Arthur H. Hawkins has been appointed manager of the Memphis office, National Enameling & Stamping Co., Granite City, Ill., to succeed F. A. Ernst, resigned. Mr. Hawkins, who has been associated with the United States Steel Corporation subsidiaries for the last 25 years, was most recently assistant manager of sales at Denver, Colo., for the American Sheet & Tin Plate Co.

H. R. Scott, for 14 years manager forge department, Pennsylvania Forge Co., Philadelphia, has resigned and is now sales manager in charge of production for the Baldt Anchor Chain & Forge Corporation, Sixth and Butler Streets, Chester, Pa.

Archil Loyer has been elected president FitzSimons Co., Youngstown, Ohio. R. E. FitzSimons has been named vice-president and general manager, and J. P. Wintrich, secretary and treasurer. Messrs. Loyer and FitzSimons were elected directors of the company, and other members of the board are D. L. Watson, the company's superintendent; H. M. Naugle, president Columbia Steel Co., Pittsburgh; James P. Keene, president Youngstown Boiler & Tank Co., Youngstown, and H. B. Howells, Cleveland.

Martin Oberg, Western district sales manager, and one of the founders of the Damascus Steel Products Corporation, Rockford, Ill., has been made sales manager of the company.

J. G. Carruthers, sales manager, Otis Steel Co., Cleveland, was elected vice-president of that company at its annual meeting, March 25. G. A. Paine was made treasurer, to succeed L. Kemper, who recently resigned, and J. W. Carpenter was elected assistant secretary-treasurer.

W. J. McIntosh, manager electric motor and hydraulic department, Fairbanks-Morse Co., Seattle, Wash., has been made manager of the Portland, Ore., offices of the company. He has been succeeded by H. S. Emanuels, for some years in the Seattle office.

T. C. Thomas, until recently superintendent, Evanston, Ill., plant of the Youngstown Sheet & Tube Co., has been made superintendent of the company's seamless tube mill at Youngstown, Ohio. He is succeeded by A. S. Gasche.

J. H. Walsh, formerly assistant superintendent, Indiana Harbor plant, Inland Steel Co., Chicago, has been appointed superintendent, succeeding W. A. Maxwell, Jr., who recently resigned to become manager of production for the Colorado Fuel & Iron Co., Pueblo, Colo. Mr. Walsh has been associated with the Inland company for five years.

Hubbard Carpenter has been elected president of George B. Carpenter & Co., Chicago, distributors of mill supplies. He succeeds his brother, the late Benjamin Carpenter. Other officers elected are John Alden Carpenter, vice-president; Fred A. McLaughlin, vice-president and general manager; Charles W. Commons,

treasurer, and Benjamin Carpenter, Jr., secretary and assistant treasurer.

J. L. Richards, president, Massachusetts Gas Companies, Boston, has returned from Florida. On account of the recent death of Robert Grant, Mr. Richards will be more active, for a time at least, in the affairs of some of the subsidiary companies, including the New England Coal & Coke Co. and the Mystic Iron Works.

E. S. Wortham, for the past 12 years sales agent in the Chicago district for the Scullin Steel Co., St. Louis, has been elected a vice-president of that company. Prior to his connection with the Scullin company he was manager of purchases and supplies for the Chicago & Alton Railroad.

R. S. Dutton, manager of sales Pickands, Brown & Co., Chicago, will sail on April 5 for a vacation in Spain and Germany.

W. S. Hovey, vice-president Fairbanks, Morse & Co., Chicago, was elected president at the annual meeting of directors on March 28. C. H. Morse, who has been president, has been made chairman of the board.

Charles A. Johnson, formerly president and general manager Midwest Metal Co., Kansas City, Mo., is president of the Niagara Lead Co., Inc., Mill Street, Lockport, N. Y., recently organized to engage in the smelting and refining of secondary metals.

F. M. Malany, 149 Broadway, New York, has been appointed representative in that district for the Stewart Die Casting Corporation, Chicago. He was formerly superintendent and chief engineer for the War Department in charge of operating and construction in the Canal Division.

Daniel J. Murphy, recently manager at Dallas, Tex., for the Harnischfeger Sales Corporation, Milwaukee, will be in charge of the company's new office to be opened at Baltimore. George W. Gimlich has been named to succeed Mr. Murphy in the Dallas branch.

John D. Hall, western manager at Chicago for the Swedish Iron & Steel Corporation, Brooklyn, has been appointed special representative for the Ziv Steel & Wire Co., 2945 West Harrison Street, Chicago, and will assume his new duties on April 1.

H. W. Marshall, formerly associated with the Anderson Co., Gary, Ind., has been added to the sales organization of the American Hammered Piston Ring Co., Baltimore, and will represent that company in Kansas, Arkansas, Oklahoma and part of Missouri.

Frank Jarosch, for some years factory manager Gurney Ball Bearing Co., Jamestown, N. Y., and since 1922 head of the Jarosch Bearings Corporation, representative in this country for the F. & S. bearing factories of Germany, has been placed in charge of the engineering department, S. B. R. Specialty Co., East Orange, N. J. He was born and educated in Europe and was associated with the bearing industry in Germany before coming to this country.

George F. Konold, Jr., has been elected president Warren Tool & Forge Co., Warren, Ohio, to succeed the late James D. Robertson.

L. W. Heller, formerly general engineer in charge of the furnace wall division of the Bailey Meter Co., has been named assistant chief engineer for the Fuller-Lehigh Co., Fullerton, Pa., following the absorption by the latter company of the coal feeder, burner and furnace wall business of the Bailey company. C. A. Maxwell, until recently associated with Day & Zimmerman,

Inc., New York, is now superintendent of construction for the Fuller-Lehigh Co., and R. M. Hardgrove, formerly research engineer for the Bailey company, holds a similar position in the absorbing company. C. R. McClure, W. R. Little, W. E. East and F. C. Brandt, formerly in charge of sales offices for the meter company at New York, Pittsburgh, Chicago and St. Louis respectively, will be retained by the Fuller-Lehigh Co.

William G. Clyde, president Carnegie Steel Co., Pittsburgh, will address the Pittsburgh Chamber of Commerce at noon, April 5, his subject being "The Contribution of Andrew Carnegie and His Associates to the Development of the Steel Industry." The address is one of a series given weekly since Jan. 18 by the Chamber of Commerce featuring talks by prominent Pittsburgh industrialists, designed to effect a better understanding of the city's history and institutions.

M. L. Mozier has resigned as assistant to the president of Witherbee, Sherman & Co., New York, after eight years' connection with the company.

## AUGUST ZIESING RETIRES

### President of American Bridge Co. Will Be Succeeded by Joshua A. Hatfield

August Ziesing, since 1905 president of the American Bridge Co., has announced his retirement, effective April 1, and will be succeeded by Joshua A. Hatfield, vice-president of the company. Mr. Ziesing became associated with the American Bridge Co. in 1900 as Western manager. He was born at Peru, Ill., in 1858, and was graduated from the University of Illinois in



AUGUST ZIESING



J. A. HATFIELD

1878. For the next two years he was employed by M. Lassig in bridge construction work at Chicago and was later engaged in structural engineering work at Wooster, Ohio, for the Pennsylvania Railroad. He was associated with the Lassig Bridge Co., Chicago, from 1882 until 1897, and for the next three years, or until he became identified with the American Bridge Co., he was engaged in practice as consulting engineer.

Joshua A. Hatfield began his business career with the Pottstown Iron Co., Pottstown, Pa., in 1880. He remained with the company 16 years, the last five as general sales agent. For the next four years he was associated with the A. & P. Roberts Co., Pencoyd Iron Works, Philadelphia, and in 1900 was made assistant to the president of the American Bridge Co., of which the former president of the Roberts company, Percival Roberts, Jr., was president. Mr. Hatfield has been a director of the American Bridge Co. since its formation in 1900 and until 1914 was president of the American Bridge Co. of New York, which was consolidated with the American Bridge Co. of New Jersey to form the present company. L. A. Paddock and Frank B. Thompson have been elected vice-presidents of the company.

## OBITUARY

ARTHUR V. DICKERSON, president Dickerson Steel Co., Dayton, Ohio, jobber of tool and alloy steels, died suddenly at Green Springs Ohio, March 25, aged 47 years. Previous to the organization of his own company he had been identified with the Union Drawn Steel Co. and the Peerless Drawn Steel Co. He was a member of the American Society for Steel Treating, the Society of Automotive Engineers, the American Iron and Steel Institute and the American Society of Mining and Metallurgical Engineers.

MICHAEL J. ALEXANDER, founder and until his retirement from active business a few years ago president Pittsburgh Valve & Fittings Co., Barberton, Ohio, died at his home in Pittsburgh, March 24. He also had been active in the glass manufacturing industry. He was born in Newburn, Va., 83 years ago.

DAVID H. KING, president Pacific Radiator & Shield Co., Seattle, Wash., died at his home in that city last week as the result of an accident in the plant of the company.

NATHANIEL M. GRAYBILL, vice-president West Coast Steel Co., Tacoma, Wash., died recently in that city.

THOMAS K. MILLER, cashier Standard Seamless Tube Co., Economy, Pa., died on March 26 from injuries sustained when he was struck by a train at the Sewickley, Pa., station. He was 63 years old and had been with the Standard company for about 10 years. Previously for many years he had been identified with the Pittsburgh Iron & Steel Foundries Co., Midland, Pa., for some time as general manager, and before that he was manager of sales for the S. Jarvis Adams Co., Pittsburgh.

GEORGE E. SAUL, treasurer Cann & Saul Steel Co., 516 Commerce Street, Philadelphia, died in that city on March 15, following a long illness. He had been associated with the company for 37 years.

A. C. BICKHAUS, head of the Bickhaus File Co., Quincy, Ill., died March 21 at his home, in that city, aged 77 years. He was born in Germany and founded the file company some 50 years ago.

## Action Taken to Liquidate British Empire Steel Corporation

TORONTO, ONT., March 29.—Roy M. Wolvin, president British Empire Steel Corporation, has severed his connection with the National Trust Co. of Toronto and Montreal as receiver manager for the Dominion Iron & Steel Co., Sydney, N. S. Mr. Wolvin has been acting as chief agent of the trust company at the Dominion Iron & Steel Co.'s plant at Sydney, and he has already relinquished office, following his resignation. The resignation of Mr. Wolvin is interpreted as another stage in the battle between the British Empire Steel Corporation and officials of the National Trust Co. The trust company, acting in behalf of certain groups of bondholders and itself as a shareholder, has taken action in the Supreme Court of Nova Scotia looking to the winding up of the British Empire Steel Corporation, the Dominion Iron & Steel Co., and other various subsidiaries with the exception of the Dominion Coal Co.

The coal company is the only unit in the "Besco" structure that is paying its way and seems to have an even chance of retaining its present corporate entity. Liquidation is considered essential before there can be any comprehensive reorganization of the steel and coal industry of Nova Scotia. At least no organization could hope to be successful, it is believed, until the capitalization has been scaled down considerably and the Government has done something for the steel companies either by way of bounties or a protective tariff.

## Announce Standardized Spindle End

(Concluded from page 931)

ameters and lengths, shoulder to nut, respectively:  $\frac{3}{8}$ -in., 10-in.; 1-in., 12-in. and 18-in.; and  $1\frac{1}{4}$ -in., 12-in. and 18-in. The 1-in. by 18-in. and the  $1\frac{1}{4}$ -in. by 18-in. arbors also have long bearing for the arbor pendant.

Ten sizes of the Style B arbor have been standardized. The diameters and lengths from shoulder to nut are as follows: 1-in., 24-in.;  $1\frac{1}{4}$ -in., 24-in.;  $1\frac{1}{2}$ -in., 18-, 24-, 30- and 36-in.; 2-in., 30- and 36-in., and  $2\frac{1}{2}$ -in., 30- and 36-in.

The threads for all arbor nuts are to be ten threads per inch U. S. form, class 2 fit. The arbors listed above will be furnished with two bearings, the diameters of the bearings to be selected by customer to suit the machine. The Style A and Style B arbors are to have the new standard keyways tentatively adopted by the cutter manufacturers and now in process of standardization by the milling cutter sub-committee of the sectional committee working under the procedure of the American Engineering Standards Committee.

The Style C arbors, for shell end mills, will conform to the standard shell end mills now in process of standardization by the milling cutter sub-committee mentioned in the preceding paragraph.

### Uniform Numbering System for New Arbors

Standard nomenclature or numbering was adopted because it was felt by the committee that a uniform numbering system was needed for the new standard arbors.

The bearing sizes are designated thus:  $1\frac{1}{8}$ -in. diameter, No. 3, for arbors up to and including  $1\frac{1}{4}$  in. in diameter;  $2\frac{1}{8}$ -in. diameter, No. 4, for arbors up to and including  $1\frac{1}{2}$  in. in diameter;  $2\frac{1}{4}$ -in. diameter, No. 5, for arbors up to and including 2 in. in diameter;  $3\frac{1}{8}$ -in. diameter, No. 6, for arbors up to and including  $2\frac{1}{2}$  in. in diameter.

The arbor symbol is made up of the arbor diameter, style, arbor length (shoulder to nut) and the bearing number, thus:  $1A\ 12$  = teated arbor 1 in. diameter, 12 in. long;  $1\frac{1}{4}A\ 18-4$  = teated arbor  $1\frac{1}{4}$  in. diameter, 18-in. long with bearing  $2\frac{1}{2}$  in. in diameter;  $1\frac{1}{2}B\ 30-5$  = plain arbor  $1\frac{1}{2}$  in. diameter, 30-in. long with bearings  $2\frac{1}{2}$  in. in diameter. For metric arbors the symbol is preceded by the letter "M" and the diameter is given in millimeters, thus:  $M25B\ 30-4$  = metric arbor 24 m/m in. diameter, Style B, 30-in. long, with bearings  $2\frac{1}{2}$  in. in diameter.

Shell end mill arbors, Style C, made to accommodate the proposed new standard shell end mills, have two variables, the diameter and the distance from the face of the spindle to the back of the cutter. These variables enter into the symbol, thus:  $1\frac{1}{2}C\ \frac{1}{2}$  = shell end mill arbor  $1\frac{1}{2}$  in. diameter with a projection of  $\frac{1}{2}$  in. from end of spindle to back of end mills. While it is expected that standard shell end mill arbors of any one diameter will be kept in stock with only one distance from end of spindle to back of cutter, the symbol allows special arbors to be ordered without confusion.

It is felt that although the above selected lists of arbors will cover the requirements of most manufacturers and users, it may be desirable for some manufacturers to carry other lengths in stock, such as short stub arbors for vertical machines, while other manufacturers will not care to carry all sizes in stock. The numbering system therefore has been made flexible enough to allow for its use on sizes other than standard, thus:  $1\frac{1}{2}B\ 3\frac{1}{2}$  = plain arbor  $1\frac{1}{2}$  in. diameter,  $3\frac{1}{2}$ -in. long shoulder to nut, with no bearings.

### Collet and Arbor Adapters

Two types of adapters have been developed, one shown in Fig. 5, fitting into the taper hole of spindle and held in with the draw-in bolt, which can be used for end mills and collets with tang drive. The other type, Fig. 6, can be used for arbors, end mills or other tools, having a threaded hole for the draw-in bolt. The latter style includes adapters for Nos. 9, 10, 11 and 12 B & S tapers, respectively. These adapters fit on the outside diameter of the spindle nose and are held in position by four bolts fitting into tapped holes in the face of the spindle.

## Round Bars Finished by Centerless Grinding

(Concluded from page 929)

rial are designing their machines in such a way that ground bar stock can be cut to length, faced and assembled directly into the machine. There is also an advantage in the fact that bars which are intended for the automatic screw machine can be made more accurate by grinding, than the usual tolerance of 0.001 per in. of diameter. A troublesome feature of screw machine operation has been in maintaining collets that work uniformly on all bars placed in the machine, and it is well known that considerable trouble can be eliminated and time saved in the screw machine department if bars more uniform as to size can be obtained. There is also the same possibility of economies by means of the grinding process when finishing stainless and other alloy steel bars of the larger diameters, as in the case of the smaller diameter bars. The centerless grinding method has been gaining favor and is in successful operation because it has been to the mutual advantage of both the steel finisher and the users of steel.

## Bureau of Standards Makes New List of Standard Samples

The Bureau of Standards, Washington, calls attention to the following standard samples, some of which are new, while others may not be well known:

Sample	Constituents	Weight of Sample
No.	Name	in Grams
56	Phosphate rock	$P_2O_5$ , $Fe_2O_3$ , $Al_2O_3$ , etc.
60	Bauxite	60 \$2.00
70	Feldspar	Full analysis 60 2.00
71	Calcium molybdate	Full analysis 40 2.00
76	Burnt refractory	Mo, Fe, Ti 60 2.50
77	Burnt refractory	(40 per cent $Al_2O_3$ ) Full analysis 60 2.00
78	Burnt refractory	(60 per cent $Al_2O_3$ ) Full analysis 60 2.00
80	Soda lime glass	Full analysis 45 2.00
57	Refined silicon	Full analysis 60 2.00
58	Ferrosilicon	(75 per cent silicon) Full analysis 75 2.00
59	Ferrosilicon	(50 per cent silicon) Full analysis 75 2.00
60	Ferrovanadium	(low carbon) Full analysis 100 3.00
61	Ferrovanadium	(high carbon) Full analysis 100 3.00
64	Ferrochromium	(high carbon) Full analysis 100 3.00
66	Spiegeleisen	Full analysis 100 2.00
67	Manganese metal	Full analysis 100 2.50
68	Ferromanganese	Full analysis 100 2.50
72	Chrome-molybdenum steel	C, Mn, P, S, Si, Cu, Ni, Cr, Mo, V, As 150 3.00
73	Stainless steel	C, Mn, P, S, Si, Cu, Ni, Cr, V, Mo, As 150 3.00

The full list of standard samples, together with analyses, fees and other details appears in the Department of Commerce Supplement to Circular No. 25, which will be sent upon application to the Bureau of Standards.

"Dust Respirators: Their Construction and Filtering Efficiency," by S. H. Katz, G. W. Smith and E. G. Meiter, is the subject of a 52-page pamphlet just published by the Bureau of Mines, Department of Commerce. The treatise covers the subject fully, providing descriptions and illustrations of the more common type of respirators and finally summing up the newer kinds of filters and their correct use. An interesting point brought out in the summary conclusion is that a respirator has not yet been developed which is a final safeguard to the worker in dusty industries.

# Machinery Markets and News of the Works

## BUYING CAUTIOUSLY

### Manufacturing Companies Slow in Ordering Machine Tools

March Business Probably Will Not Exceed That of February—Considerably Below Same Month in 1926

CAUTION is generally observed by buyers of machine tools, with the result that orders so far this month have not greatly exceeded, if at all, those of last month. In some lines business has developed more slowly than during the first quarter of last year, and this fact has affected plans for replacement of shop tools or expansion of manufacturing facilities.

It is estimated that the aggregate of machine tool buying in the first quarter of this year will be about 80 or 85 per cent of that done in the same period last year. Another estimate is that March business this year will be about 25 per cent less than that of March, 1926.

Production is being carried on in machine tool plants at a moderate rate, and little variation from present scale of operations is anticipated in the near future.

Sales to motor car and parts manufacturers are more numerous, but the volume of business from this source has not been up to expectations.

Railroad orders of the week have included two car-wheel borers and an axle lathe for the Chicago & Eastern Illinois and a combination journal turning and axle lathe for the St. Louis-San Francisco.

## New York

NEW YORK, March 29.

MANUFACTURING companies which use metal-working machinery continue to buy very cautiously. The aggregate of business within the past week has been about on a par with that of previous weeks of March. Indications are that the month as a whole will not show any improvement over February.

Among the week's orders were the following: University of Idaho, universal milling machine; a car heating and lighting company in Connecticut, a duplex milling machine; a paper company in Boston, a cold saw; Connecticut State Hospital, a vertical drill press; a Detroit motor car company, two jig borers; the Niles Tool Works Co., Hamilton, Ohio, a gear grinder; the Haynes Stellite Co., two profiling machines; a special machinery company at Hartford, Conn., a thread milling machine; an electrical company in eastern Canada, a 16-in. lathe.

The Central Structural Steel Co., Harlem River and 152nd Street, New York, has filed plans for a one-story addition, 62 x 256 ft., to cost in excess of \$25,000. Paul Orzelt, 670 East 170th Street, is architect.

The New York Plumbers Specialties Co., Inc., 1298 Crescent Street, Far Rockaway, L. I., is having plans completed for a new two-story plant to cost about \$70,000. Max Horn, 171 Beach Seventy-fifth Street, Arverne, N. Y., is architect.

The Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, is having plans drawn for a new service, repair, parts and sales building at Albany, N. Y., to cost in excess of \$115,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect.

The Kny-Scheerer Corporation, 119 Seventh Avenue, New York, manufacturer of surgical instruments, etc., is completing the removal of its plant to a factory on Frelinghuysen Avenue, Newark, N. J., acquired several months ago, and will concentrate production at the new location.

The Insulation Mfg. Co., Inc., 70 Washington Street, Brooklyn, has acquired the plant and business of the General Insulate Co., Inc., 1008 Atlantic Avenue, which will be continued as a subsidiary organization. The two plants will provide about 30,000 sq. ft. of floor space for manufacture, to include a machine shop particularly designed for the production of complicated molds and dies.

The Board of Education, Rensselaer, N. Y., is considering the installation of manual training equipment in a proposed new junior high and grade school, to cost \$200,000, for which bids will be asked on a general contract early in

April. C. H. Gardiner, 46 North Pearl Street, Albany, N. Y., is architect.

The North American Co., 60 Broadway, New York, operating the Cleveland Illuminating Co., Cleveland, the Union Electric Light & Power Co., St. Louis, and other electric power interests, is arranging for an increase in capital from \$60,000,000 to \$100,000,000, and from 6,000,000 shares of stock to 10,000,000 shares, a portion of the proceeds to be used for expansion and betterments.

The Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen, welding apparatus, etc., is said to have plans for a new factory branch at Amarillo, Tex., where property has been secured in the Odom-Cotton Industrial section, reported to cost more than \$40,000 with equipment.

In connection with the additions to the Kearny, N. J., plant of the Western Electric Co., 195 Broadway, New York, for which superstructure has been begun, the company has authorized an expansion program to provide for a total of 225,000 sq. ft. of new manufacturing space during 1927. Plans have been approved also for rebuilding a large portion of the works at Hawthorne, Ill., devoted to cable production.

William Newmann, 999 Bergenline Avenue, Jersey City, N. J., architect, has plans under way for a new two-story automobile service, repair and garage building, to cost \$100,000 with equipment.

The Becton-Dickinson Co., Cornelia Street, East Rutherford, N. J., manufacturer of surgical instruments, etc., has filed plans for a one-story top addition to its present two-story factory, to be 60 x 400 ft., estimated to cost in excess of \$50,000 with equipment.

The Crescent White Metal Co., 43 South Sixth Street, Newark, N. J., manufacturer of automobile fittings and accessories, has purchased a two-story factory on site, 54 x 105 ft., heretofore held by the Hanson & Van Winkle Co. The present works will be removed and additional equipment provided.

The Gold Seal Mfg. Co., Inc., 117 Mulberry Street, Newark, manufacturer of radio tubes and equipment, has leased a three-story factory to be erected by James Sutherland, Inc., 133 South Fifteenth Street, estimated to cost \$70,000. The present plant will be removed to the new location and considerable additional equipment installed. William E. Lehman, 972 Broad Street, is architect.

The Board of Trustees, Harriman, N. Y., contemplates the installation of pumping machinery in connection with a new municipal waterworks estimated to cost \$75,000. Bids will be asked in June. H. J. Harder, 129 Market Street, Paterson, N. J., is engineer.

Almiral & Co., Inc., has removed its general offices to 53 Park Place, New York.

The New York office of the SKF Industries, Inc., formerly at 165 Broadway, has been removed to 40 East Thirty-fourth Street.

The Otis Elevator Co., Eleventh Avenue and Twenty-sixth Street, New York, has awarded contract to the Turner Construction Co., New York, for the erection of a machine shop, 66 x 84 ft., to its plant at Yonkers, N. Y.

The Alexander Smith & Sons Carpet Co., Yonkers, will erect a power house, 49 x 50 ft., 45 ft. high. Contract has been let to the Turner Construction Co., New York.

## New England

BOSTON, March 28.

SALES in March will aggregate the smallest experienced by local machine tool houses so far this year. Business the past week was confined to a few individual tools, in a majority of cases new, and of small total value. The most encouraging feature as the month closes is the prospective increase in operations of machine shops and other metal-working plants in New England. Resumption of negotiations with machine tool dealers regarding equipment requirements is taken to indicate greater activity in the metal-working industry. Some tools under active negotiation have been considered prospects since early January and before. There has been some new inquiry, particularly from Rhode Island and Connecticut, mostly for single machines, however.

Work has started on a two-story, 47 x 60 ft., blacksmith shop for Ernest G. Colpitts, 18-20 New England Avenue, Dorchester section, Boston. Plans are private.

Bids close April 4 on a municipal garage and machine shop for the city of Nashua, N. H. Plans are private.

The Braun Bearings Co., Inc., Portland, Me., has been organized to manufacture a new type of self-aligning adjustable ball bearing. A plant has been built and will be in operation in a few weeks.

The American Chain Co. is moving its chain welding department from its Bridgeport, Conn., plant to its plant at York, Pa.

W. Irving Bullard, New England banker and textile manufacturer, has acquired control of the Williamsville Buff Mfg. Co., Danielson, Conn., manufacturer of buffing wheels.

Bids have been asked by C. H. Dexter & Sons, Inc., Windsor Locks, Conn., manufacturer of paper products, for a four-story addition, 80 x 100 ft., to cost more than \$100,000 with equipment. Greenwood & Noerr, 947 Main Street, Hartford, Conn., are consulting engineers.

The International Silver Co., Meriden, Conn., has plans for a one-story addition to its plant at Bridgeport, Conn., 50 x 108 ft., saw-tooth roof type, to cost about \$30,000.

The Crane Co., South Avenue, Bridgeport, Conn., has awarded a contract to the Berlin Construction Co., Berlin, Conn., for a one-story addition to its factory branch, 60 x 350 ft., to cost close to \$80,000 with equipment. Headquarters are at 836 South Michigan Boulevard, Chicago.

The City Council, Warwick, R. I., is said to be planning the installation of pumping machinery and power equipment in connection with a proposed municipal waterworks, to cost more than \$750,000.

The Tidewater Oil Sales Corporation, 11 Broadway, New York, is completing plans for a new oil storage and distributing plant at New Haven, Conn., to cost about \$66,000 with equipment. The main structure will be 50 x 62 ft.

The Setag Paper Co., Chappaqua, N. Y., is completing plans for an addition to its Riverton mill at Winsted, Conn., to include the installation of new machine units, paper-twisting and other equipment, to cost more than \$75,000.

The Superior Cabinet Works, Inc., 93 Newall Street, Pawtucket, R. I., is considering plans for a new factory, to cost approximately \$50,000 with equipment.

The Manton-Gaulin Mfg. Co., 11 Elkins Street, Boston, manufacturer of dairy machinery and parts, is planning the construction of a one-story branch plant at St. Johnsbury, Vt., to cost about \$50,000 with equipment. John W. Davis is president.

The New England Metal Products Co., Bridgeport, Conn., organized recently, has work under way on extensions and improvements in the factory of the Miller Co., Meriden, Conn. The company will remove from Bridgeport, providing additional equipment for increased capacity.

The Boston Machine Screw Co., Tudor Street, Boston, has filed plans for a two-story addition to cost about \$40,000 with equipment. The S. S. Sperry Co., Kendall Square Building, are architects.

The T. J. Pardy Construction Co., 1481 Seaview Avenue,

Bridgeport, Conn., has secured an award for a three-story automobile service, repair and garage building at Westport, Conn., to cost about \$130,000 with equipment.

The Western Massachusetts Companies, Inc., Turners Falls, Mass., has been organized to take over and consolidate the Turners Falls Power & Electric Co., and a group of six smaller electric light and power companies operating in this section. Plans are under way for expansion, including transmission line construction.

## Detroit

DETROIT, March 28.

PLANS are being prepared for a one-story addition to the plant of the Mogul Metal Co., 11031 Shoemaker Street, Detroit, to cost in excess of \$50,000. Pollmer & Ropes, 2539 Woodward Avenue, are architects.

The Briggs Mfg. Co., 11631 Mack Avenue, Detroit, manufacturer of automobile bodies, is having plans drawn for a five-story addition, to cost more than \$150,000 with equipment. Albert Kahn, Inc., Marquette Building, is architect.

The plant and equipment of the Rickenbacker Motor Co., Cabot Street, Detroit, will be offered at a public sale by the receiver on April 14. William Sayres, Jr., is special master in bankruptcy.

Robinson & Campau, Grand Rapids, Mich., architects, are completing plans for a new six-story automobile service, repair and garage building, 50 x 155 ft., to cost about \$125,000 with equipment.

The Board of Education, Flushing, Mich., is considering the installation of manual training equipment in a proposed three-story high school, to cost \$175,000, for which it is expected to ask bids on a general contract in May. The Warren-Holmes-Powers Co., Capitol Savings and Loan Building, Lansing, Mich., is architect.

The Detroit Edison Co., Detroit, has completed plans for a new one-story power substation on local site, to cost about \$300,000 with machinery.

Ovens, power equipment, conveying, elevating and other machinery will be installed in the five-story and basement addition, 117 x 200 ft., to be constructed by the Postum Cereal Co., Battle Creek, Mich., to cost about \$750,000 with machinery. Bids will be asked early in April. Lockwood, Green & Co., Buhl Building, Detroit, are architects and engineers.

The Brickner & Kropf Machine Co., Muskegon Heights, Mich., is completing plans for a one-story addition, to cost about \$30,000 with equipment.

The Common Council, Utica, Mich., is planning the installation of a new pumping plant for the municipal waterworks. E. H. Pate, Lincoln Building, Detroit, is engineer.

The Kirsch Mfg. Co., Sturgis, Mich., manufacturer of curtain rods, etc., has plans for an addition, to cost about \$50,000 with equipment.

The Cyclops Steel Co., Titusville, Pa., recently opened a district office and warehouse at 5132 Grand River Avenue, Detroit, in charge of A. F. MacFarland.

The Schlenker Hardware Co., 213 West Liberty Street, Ann Arbor, Mich., has been incorporated to manufacture sheet metal products. Included in its line for both wholesale and retail distribution will be hardware and general merchandise, radio equipment, outboard motors, plumbing supplies, sheet metal and roofing and warm air heating equipment.

## Buffalo

BUFFALO, March 28.

CONTRACT has been let by the Rome Brass & Copper Co., Rome, N. Y., to the Shance Construction Co., Herald Building, Syracuse, N. Y., for a one-story addition, to cost in excess of \$50,000 with equipment.

The Robert Gair Co., 350 Madison Avenue, New York, manufacturer of box board, folding boxes, etc., is disposing of a bond issue of \$5,000,000, a portion of the proceeds to be used in connection with the recent purchase of a mill at Tonawanda, N. Y., to be operated as a new plant unit. Part of the fund will be used also for extensions and improvements in the plant at Piermont, N. Y., where production previously carried on at Brooklyn will be concentrated.

Ovens, power equipment, conveying and other machinery will be installed in the seven-story plant to be erected at Buffalo by the National Biscuit Co., 85 Ninth Avenue, New York, for which a general contract has just been let to the J. W. Cowper Co., Fidelity Building, Buffalo. A service, repair and garage building for company motor trucks will also be built. The entire project will cost \$850,000.

The International Casement Co., Hopkins Avenue, Jamestown, N. Y., manufacturer of window casements, etc., has plans for a one-story addition, to cost close to \$40,000 with

## The Crane Market

INQUIRIES for electric overhead and locomotive cranes continue to accumulate, but prospective purchasers are slow to close business. The Vermont Marble Co., Proctor, Vt., has been taking bids on overhead equipment including electric hoists and chain blocks. Sanderson & Porter, engineers, 52 William Street, New York, are about to close on a 20-ton electric traveling crane for use in Arizona. The F. R. Patch Mfg. Co., Rutland, Vt., is inquiring for a used 25-ton, gasoline operated locomotive crane. The Colonial Marble Co., Rutland, Vt., is in the market for a 25 ton crane.

Among recent purchases are:

Union Carbide Co., Niagara Falls, N. Y., a 25-ton locomotive crane from the Industrial Works.

Elizabeth Art Stone Co., Newark, N. J., a 15-ton elec-

trically driven, used Browning locomotive crane from the Hoisting Machinery Co.

Lackawanna Steel Construction Corporation, Buffalo, a 22½-ton used Ohio locomotive crane from J. T. Walsh, Brisbane Building, Buffalo.

Frazier Davis Construction Co., St. Louis, a 7-ton, gasoline driven, crawl-tread locomotive crane from the Orton Crane & Shovel Co.

Krueger Broughton Lumber Co., Minneapolis, a 7-ton, gasoline driven, barge crane from the Orton Crane & Shovel Co.

W. W. Kimball Co., Chicago, a gasoline driven, crawl-tread locomotive crane, through Thaleg & Hock, Inc., Chicago, from the Bergan-Schmidt Co.

equipment. It is understood that bids will be asked late in April. Beck & Tinkham, Bailey Building, are architects.

The Board of Education, Depew, N. Y., is said to be planning the installation of manual training equipment in a proposed three-story addition to the high school, to cost \$150,000, for which bids have been asked on a general contract. F. A. Spangenberg, 250 Delaware Avenue, Buffalo, is architect.

The Union Carbide Co., Union Street, Niagara Falls, N. Y., has asked bids on a general contract for a one-story addition, to cost in excess of \$45,000 with equipment.

The Clark, Cadle, Harmon Corporation, Rochester, N. Y., has changed its name to the Progressive Foundry Works, Inc.

The plant of the McKim Foundry & Machine Co., Lockport, N. Y., has been purchased by the Harrison Radiator Corporation for \$100,000. Immediate possession is to be given and between \$60,000 and \$80,000 will be spent on new equipment and improvements.

The Multipost Co., Rochester, N. Y., manufacturer of automatic stamp affixing machines, will increase its capitalization from \$200,000 to \$400,000. Plans have been completed by Charles E. Lathrop, local architect, for an addition to the factory to double the present capacity.

The Central City Machine & Tool Co., Syracuse, N. Y., has purchased a site, 80 x 100 ft., at 503-505 West Belden Avenue, and will erect a two-story machine shop.

The Syracuse, N. Y., office of the Kalman Steel Co., formerly at 441 South Salina Street, has been removed to 203 Harrison Street.

The General Electric Co. has opened a service shop and warehouse in Buffalo to serve the electrical industry in the western part of the State.

The Northern Conveyor & Mfg. Co., Janesville, Wis., manufacturer of belt conveyors, portable steel hoppers, cement bag cleaning machines, etc., is establishing a direct factory branch office at Binghamton, N. Y., to handle New York and New England business. It will be in charge of H. E. Whitnall, vice-president. The Northern company is starting work on the enlargement of its plant at an estimated cost of \$75,000. J. B. Whitnall is president.

## Philadelphia

PHILADELPHIA, March 28.

BIDS will be asked early in April by the Quaker City Cold Storage Co., Water and Spruce Streets, Philadelphia, for a proposed eleven-story cold storage and refrigerating plant, to cost close to \$1,000,000 with machinery. The Ballinger Co., 105 South Twelfth Street, is architect and engineer. H. P. Serrill is president.

The Board of Public Education, Keystone Building, Philadelphia, is asking bids until April 5 for a quantity of saws, steel cabinets, steel lockers, etc. William Dick is secretary and business manager.

The Imperial Type Metal Co., 1226 North Howard Street, Philadelphia, has awarded a general contract to Roberts & Roller, Inc., 1700 Walnut Street, for its one-story and basement plant, 45 x 90 ft., to cost about \$45,000.

The McQuay-Norris Mfg. Co., Cooper and Southwest Avenues, St. Louis, manufacturer of piston rings, etc., has leased a portion of the building at Twelfth and Hamilton Streets, Philadelphia, for a factory branch and distributing plant.

The Nelson-Pedley Co., Corn Exchange Building, Philadelphia, contractor, has secured a contract for a six-story and basement automobile service, repair and garage building at 819-93 Walnut Street, to cost about \$200,000 with equipment.

The Philadelphia Storage Battery Co., Ontario and C Streets, Philadelphia, has arranged with the Central Manufacturing District, Chicago, for a lease of land at South Turner Avenue and West Forty-seventh Street, as a site for a new one- and two-story factory branch, with service, repair and distributing departments, estimated to cost \$150,000 with equipment.

The Board of Education, Birdsboro, Pa., plans the installation of manual training equipment in a new two-story and basement high school, to cost \$165,000, for which bids will be asked soon on a general contract by Ritcher & Eller, 147 North Fifth Street, Reading, Pa., architects.

The Philadelphia & Reading Railroad, Twelfth and Market Streets, Philadelphia, has plans in progress for a new engine house and shops at its yards at Shamokin, Pa., to cost about \$200,000 with equipment. Clark Dillenback is chief engineer.

Luther B. Smith, Rossville, Pa., operating a motor truck and parts manufacturing works, will rebuild the portion of the plant recently destroyed by fire. It will be one-story, 35 x 165 ft., and cost about \$35,000 with equipment. Witman & Royer, 47 East Market Street, York, Pa., are architects.

The Central Railroad of New Jersey, 143 Liberty Street, New York, is arranging for the early construction of a new engine house and shops at Bethlehem, Pa., where work has been in progress for a new terminal. A power house, coaling plant and storehouses will be built under the 1927 expansion program. The entire project is reported to cost more than \$350,000 with equipment.

In connection with a new course in industrial training, the Board of Education, Williamsport, Pa., is planning for the installation of vocational shops in the present junior high school, including metal-working, automobile and wood-working departments.

The Pennsylvania Gas & Refractories Co., Philadelphia, is acquiring property in and about Layton, Pa., near Connellsville, and is contemplating the erection of a plant for making face brick. F. S. Wood is president of the Sharples Separator Co.

The Lansdowne Steel & Iron Co., 201 McKinley Avenue, Lansdowne, Pa., has been organized to manufacture light special machinery. A plant has been erected and is in operation.

## Milwaukee

MILWAUKEE, March 28.

FROM the character of inquiry the past 10 days, the automotive industry gives promise of becoming a more active factor in the machine-tool market. General industrial requirements are holding up the present moderate volume and there are prospects of more activity with respect to industrial construction. Tool builders have been able to maintain production schedules, although usually having caught up on deliveries. March sales as a rule exceeded those of February, although falling below those of a year ago.

The Board of Industrial Education, Cudahy, Wis., is asking bids until April 11 for the construction of the first unit of the Cudahy Vocational School. The equipment of the present school in temporary quarters will be materially augmented. Additional tools and machinery will be purchased about May 15 or June 1. Edward C. Seifert is secretary.

The Smith-Mannis-Winnig Co., 10 South Macy Street, Fond du Lac, Wis., wholesale fruit dealer, will build a new \$65,000 cold storage warehouse and handling plant. It will be 83 x 84 ft., two and three stories, with artificial ice machine and refrigerator plant. J. E. Stepnoski, local architect, is in charge.

The Sheboygan Motor Co., 1215 North Ninth Street, Sheboygan, Wis., is taking bids for the erection of a new sales and service station, 60 x 100 ft., part two stories and basement, to cost about \$40,000 with equipment.

The Kewaskum, Wis., Aluminum Co., manufacturer of utensils, novelties and other drawware, has postponed until July or August its proposed construction of a two-story addition, 50 x 100 ft.

The Village Board of Kohler, Wis., will close bids April 9 for the construction of a 200,000-gal. reservoir, a pumping station, 24 x 36 ft., and for furnishing and installing either air lift equipment or a deep well turbine unit. The consulting engineer is the Jerry Donohue Co., Sheboygan, Wis. William Nestmann is village clerk.

The Common Council, La Crosse, Wis., has engaged Alvord, Burdick & Howson, consulting engineers, 8 South Dearborn Street, Chicago, to prepare plans for the enlargement of the municipal water supply system and the installation of four additional pumping units in the city water plant. C. C. Congdon is city engineer.

Linck's Wire Forming Co., Milwaukee, has been incorporated with \$10,000 capital stock and has established a plant at 669 Howell Avenue to manufacture machinery and devices for forming wire and also to manufacture wire products for machinery, automobiles, etc. The incorporators are John A. Linck, Edward Inman, and Joseph F. Linck, who has been secretary of the Lynx Wire Specialties Co., 534-536 Lapham Street, Milwaukee.

The Madison Garage Co., Madison, Wis., has been incorporated with \$150,000 capital stock by a group of local business men for the erection of a public garage, with service and repair station costing about \$125,000. Plans are being prepared by local architects and it is expected that bids will be taken about May 1. George C. Flynn, 114 South Henry Street, is one of the principals.

## Chicago

CHICAGO, March 28.

MARCH sales of machine tools in this district will approximate the total for February, but will run behind those for the month of January. Compared with a year ago, orders are fully 25 per cent lighter. In the week there has been a noticeable pick-up in inquiries for the smaller sizes of tools from widely diversified users. Orders, however, are scarce and in many instances requests for prices give scant promise of early sales. Purchases of machine tools have been running light for the past two months and shipments have not overtaxed builders, with the result that delivery is prompt in practically all lines. The Illinois Steel Co. is reported to have closed on its list, a large part of which was taken by used machinery dealers. A fair amount of business is coming from automotive plants and manufacturers tributary to that industry.

The General Motors Truck Co., a subsidiary of the General Motors Corporation, has purchased property at Pershing Road and Paulina Street, Chicago, and will erect a branch factory to cost \$200,000.

The Holton Seelye Co., 140 South Dearborn Street, Chicago, will build a truck assembly and service shop to cost \$100,000. Albert Kahn, Detroit, is architect.

The C. R. Henry Novelty Co., Providence, manufacturer of adjustable curtain brackets, will open a branch factory at North Chicago, Ill., where it has acquired 4000 sq. ft. of floor space in a building at the corner of Commonwealth Avenue near Twenty-second Street.

The Cedar Rapids Sheet Metal Co., 710 South Third Street, Cedar Rapids, Iowa, has been incorporated with a capital of \$30,000 to manufacture sheet metal products from No. 8 gage and lighter. It has purchased the stock and equipment of the Cedar Rapids Cornice Works, and has added some equipment as well as a sheet metal welding department. The company is in the market for a deep throat punch press, and will consider a used machine. Other materials will be needed.

The H. E. Erickson Co., 114 South Third Street, Minneapolis, has been appointed exclusive distributor in the north central territory for the Novo Engine Co., Lansing, Mich.

The Haag Brothers Co., West Washington Street, East Peoria, Ill., manufacturer of washing machines and parts,

has awarded a general contract to F. Harbers & Sons, Central National Bank Building, Peoria, for a one-story addition, 150 x 160 ft., to cost close to \$100,000 with equipment.

The Elgin Clock Co., Elgin, Ill., has awarded a general contract to C. E. Giertz & Son, McBride Building, for an addition to its plant to cost about \$150,000 with equipment.

The Chicago Store & Office Fixture Co., 818 South Clinton Street, Chicago, has leased a six-story building, 50 x 100 ft., and will remodel for a new factory.

The Board of Education, 650 South Clark Street, Chicago, contemplates the installation of manual training equipment in a new four-story high school, to be constructed at 3533-45 Fulton Street, estimated to cost \$1,200,000. J. C. Christianson is architect for the board.

The Certain-teed Products Corporation, 100 East Forty-second Street, New York, manufacturer of roofing, etc., has awarded a general contract to the Wimmer Construction Co., Victoria Building, St. Louis, for its factory branch and distributing branch at Marselles, Ill., one-story, 125 x 240 ft., to cost about \$75,000. Klipstein & Rathman, 316 North Eighth Street, St. Louis, are architects.

Nels J. Billstrom, Rockford, Ill., manufacturer of woodworking machinery, will soon begin the construction of a new plant, one and two stories, 80 x 155 ft., to cost close to \$50,000 with equipment. It is understood that the present plant will be removed to the new location.

The Borin Mfg. Co., Cicero, Ill., manufacturer of picture frames and kindred products, has engaged J. J. Novy, 2434 South Ridgeway Avenue, Chicago, architect, to prepare plans for its one-story factory on site recently acquired, estimated to cost about \$200,000 with machinery.

Ovens, power equipment, conveying and other machinery will be installed in the new mill to be constructed by the Quaker Oats Co., 80 East Jackson Boulevard, Chicago, at Saskatoon, Sask., to cost more than \$900,000 with machinery. It is planned to begin work during the summer.

The Spaun Implement Co., care of J. F. Pillsbury, Midland Savings Building, Denver, Colo., architect, will soon begin the construction of a new one-story and basement plant, 50 x 80 ft., to cost close to \$18,000.

The Clarke Sanding Machine Co., 1215 Maplewood Avenue, Chicago, has awarded a general building contract to N. Nelson, 6642 North Leavitt Street, for a proposed one and two-story plant, 43 x 125 ft., and 100 x 110 ft., to cost close to \$65,000 with equipment.

The Board of Education, Wood River, Ill., contemplates the installation of manual training equipment in a proposed two-story and basement addition to its high school to cost about \$200,000, for which bids have been asked on a general contract. W. B. Ittner, Board of Education Building, St. Louis, is architect.

Fire in the branch plant of the Air Reduction Sales Co. at Bettendorf, Iowa, March 22, caused a loss of \$100,000.

The Industrial Engineering Co., a new organization for designing and manufacturing tools, dies and special sheet metal fabricating machinery, as well as experimental and development work, has taken over the former plant of the D. M. Sechler Implement Co., 629 Third Avenue, Moline, Ill. S. S. Battles and O. N. Brown, formerly of the Illinois Oil Co., Rock Island, head the new company.

## Cincinnati

CINCINNATI, March 28.

THE volume of machine tool business booked by local builders in March has been about equal to that of February, but total sales in the first quarter of 1927 have been only from 80 to 85 per cent of those in the same period last year. In 1926 March was a peak month, whereas this year sales were somewhat disappointing. With the large number of inquiries on which quotations have been made, machine tool executives are at a loss to account for the slowness with which buyers are closing for equipment. Production in this market is being carried on at a moderate rate, and little variation from the present scale of operations is anticipated in the near future. Sales to the automotive industry have taken an upward turn, one manufacturer in the Detroit district having placed an order for five lathes.

A local builder has sold seven large lathes for export to England. The Chicago & Eastern Illinois Railroad has bought two 48-in. carwheel borers and a No. 3 axle lathe, while the St. Louis-San Francisco has purchased a combination journal turning and axle lathe. The Sinclair Pipe Line Co., Tulsa, Okla., has contracted for a 48-in. 300-ton wheel press. Two orders, each calling for an 18-in.

engine lathe, have been received by a Cincinnati company.

The Cleveland, Cincinnati, Chicago & St. Louis Railroad Co., Dixie Terminal Building, Cincinnati, has awarded a general contract to the Fisher Devore Construction Co., Cincinnati, for its proposed car shops on Mitchell Avenue, to cost close to \$500,000 with equipment.

The Columbus Heating & Ventilating Co., 425 West Town Street, Columbus, Ohio, will take bids at once for a two-story addition, 60 x 100 ft., to cost about \$40,000 with equipment. Raymond M. Spencer is chief engineer.

The Chattanooga Terminal Warehouses, Inc., Mississippi Avenue, Chattanooga, Tenn., has acquired property on East Eleventh Street and plans the construction of a new cold storage and refrigerating plant, to cost in excess of \$350,000 with equipment. Z. W. Wheland is president.

The White Motor Co., Cleveland, is planning the construction of a two-story and basement service and repair branch at New Lexington, Ohio, 65 x 85 ft., to cost about \$50,000 with equipment.

The Murfreesboro Red Cedar Co., Murfreesboro, Tenn., manufacturer of buckets, tanks, etc., will rebuild the portion of its plant recently destroyed by fire, with loss reported in excess of \$60,000 with equipment.

The Ohmer Fare Register Co., Dayton, Ohio, manufacturer of recording and printing fare registers, taximeters, industrial counters, etc., is disposing of a note issue of \$1,500,000, a considerable portion of the proceeds to be used in connection with an expansion program.

The Acme Flour Mills, Inc., Hopkinsville, Ky., is considering the rebuilding of the portion of its mill recently destroyed by fire with loss reported in excess of \$200,000 with machinery. W. B. Anderson, Jr., is president.

The Paducah Ice Mfg. Co., Paducah, Ky., is planning a one-story addition, 20 x 500 ft., to cost in excess of \$25,000.

The City Council, Hamilton, Ohio, has authorized the purchase of a centrifugal pumping unit for the municipal water department, with capacity of 7,000,000 gal. per 24-hr., estimated to cost about \$24,000. G. C. Mitchell is municipal service director.

Homer R. Martindale, Middletown, Ohio, has acquired the real estate and machinery of the Middletown Machine Co. for \$55,000.

## South Atlantic States

BALTIMORE, March 28.

THE Southern Pulp & Naval Stores Co., Columbus, Ohio, has arranged for the purchase of the plant of the Atlantic Paper & Pulp Corporation, Port Wentworth, Ga., closed for a number of months owing to financial difficulties. The new owner plans extensions and improvements, including the construction of a unit on adjoining site for the production of kraft papers. The total investment will approximate \$500,000. The purchasing company recently began the construction of a sulphite pulp mill at Dublin, Ga. C. M. Thorsen is president, and C. R. Templeton, treasurer.

E. Canby May, du Pont Building, Wilmington, Del., architect, has plans for a new two-story automobile service, repair and garage building at Salisbury, Md., to cost \$95,000 with equipment.

H. B. Knox, Winston-Salem, N. C., plans the purchase of machinery for the production of spokes for automobile wheels.

The Dorchester Lumber Co., Badham, S. C., is in the market for an electric generator, belted-type, d.c., about 150-kw. capacity.

The Golden Foundry & Machine Co., Columbus, Ga., has awarded a general contract to the Batson-Cook Co., West Point, Ga., for an addition for the production of gray iron castings, pattern department and other service, to cost more than \$50,000 with equipment. J. E. Sirrine & Co., Greenville, S. C., are engineers.

The Neill-Buick Co., Maryland and Mount Royal Avenues, Baltimore, representative for the Buick automobile, has awarded a general contract to M. A. Long & Co., 10 West Chase Street, for its three-story service, repair and garage building, to cost close to \$100,000 with equipment.

The Greensboro Loom Reed Co., Greensboro, N. C., manufacturer of textile mill equipment, plans the construction of a new one-story plant, 40 x 100 ft., to double, approximately, the present capacity.

J. A. Acker, Port Huron, Mich., and associates are completing plans for the construction of a new cement mill in the vicinity of Newbern, N. C., where site has been purchased. The initial plant will be equipped for an output of about 100,000 bbl. per month, and is estimated to cost more than \$2,000,000. Limestone properties in this district will be developed for raw material supply.

Wallin & Comer, Savannah, Ga., architects, are completing plans for a new multi-story automobile service, repair and garage building to cost \$200,000 with equipment.

The Laurens Ice & Cold Storage Co., Laurens, S. C., has organized a subsidiary to be known as the Ninety-Six Ice Co., to establish and operate an ice-manufacturing and cold storage plant at Ninety-Six, S. C., to cost about \$45,000. Work will begin at once.

The Carolina Power & Light Co., Raleigh, N. C., has begun the construction of two new hydroelectric generating plants on the Yadkin and Big Pigeon Rivers, respectively. The first will be located near Norwood, N. C., and will be equipped for a capacity of 62,000 kw. It is estimated to cost more than \$7,500,000 with equipment. The other will be situated near the North Carolina-Tennessee State lines, and will have an initial output of 65,000 kw., and ultimate capacity of 100,000 kw. It will cost approximately \$12,000,000. Transmission lines will be built.

## Pittsburgh

PITTSBURGH, March 28.

A FAIR number of single orders has recently been closed by machine tool dealers, but the tendency to defer purchases still prevails. New inquiries are not numerous. In heavy equipment, the outstanding order has been a 35-in. blooming mill for the Canton works of the Central Alloy Steel Corporation placed with the Mackintosh-Hemphill Co.

The Penn Storage Battery Co., 5754 Baum Boulevard, Pittsburgh, has leased property, 28 x 200 ft., at 6518 Penn Avenue, for a new branch works.

The Pittsburgh Metal Ceiling Co., 109 Fourth Avenue, Pittsburgh, has acquired a building at 229 First Avenue, 30 x 80 ft., for expansion.

The General Motors Corporation, Detroit, is reported to be planning the construction of a new assembling plant on Liberty Avenue, Pittsburgh, to cost more than \$200,000.

The Valley Electric Co., Romney, W. Va., is considering the construction of a hydroelectric generating plant in Hampshire County to cost in excess of \$150,000. A transmission system will be built.

Fire, March 17, destroyed a portion of the car shops of the Western Maryland Railroad Co., at Elkins, W. Va., with loss in excess of \$135,000 including equipment. Headquarters are at Baltimore.

The Fashion Furniture Co., Jamestown, N. Y., plans the early rebuilding of the portion of its plant at Youngsville, Pa., recently destroyed by fire with loss of about \$50,000. New equipment will be installed.

The American Window Glass Co., Farmers' Bank Building, Pittsburgh, is planning for extensions and improvements in its sheet glass plant at Belle Vernon, Pa., including the installation of modern machinery for flat glass production to replace the present tubular process. Effective early in April, the plant will be shut down for about four months to allow for the expansion. New equipment will be provided in other departments.

Thomas Pringle, Renshaw Building, Pittsburgh, architect, has plans under way for a two-story automobile service, repair and garage building at Wilkinsburg, Pa., to cost in excess of \$60,000 with equipment. Bids will be asked in about 30 days.

The Pennzoll Co., Oil City, Pa., has awarded contract to Arthur G. McKee & Co. for a gasoline cracking plant. It will require 500 to 600 tons of iron and steel, including structural material, pipe and cast iron fittings.

## Gulf States

BIRMINGHAM, March 28.

PLANS are being considered by the Louisville & Nashville Railroad Co., Louisville, for rebuilding the portion of its shops at Boyles, Ala., destroyed by fire March 16, with loss reported at \$90,000 including equipment.

The City Commission, Jacksonville, Fla., is asking bids until April 14 for equipment for the municipal electric light and power plant, including a crane, mechanical fans, motors and controllers, generator cooler, oil pumps, closed heaters, desuperheaters, evaporators, and oil heaters. The Scofield Engineering Co., Commercial Trust Building, Philadelphia, is engineer. M. W. Bishop is secretary.

The Birmingham National Garage, Inc., 2028 First Avenue, North, Birmingham, is having plans drawn for a seven-story service, repair and garage building, 110 x 185 ft., to cost \$650,000. Warren, Knight & Davis, Empire Building, are architects.

The Limestone Products, Inc., Professional Building, Ocala, Fla., J. G. Hall, president and general manager, plans the installation of a hydrate lime plant at its properties. The company has a tract of about 21 acres of deposits and

has begun work on a crushing plant. A washing and screening plant is also being considered.

The El Paso Electric Co., El Paso, Tex., is completing plans for additions in its steam-operated electric generating plant, including the installation of high pressure boiler units, coal-handling equipment and other machinery. The work will be carried out in connection with an expansion program to cost more than \$500,000.

The Eureka Foundry Co., Gadsden, Ala., is planning the construction of a one-story addition, 60 x 100 ft., to be used largely for the production of iron castings for cotton mill equipment.

The Napthalene Products Co., Tarrant City, Ala., has plans under advisement for rebuilding the portion of its plant destroyed by fire March 21, with loss in excess of \$50,000 with equipment.

The Atchison, Topeka & Santa Fe Railroad Co., Dallas, Tex., is said to have plans under way for enlargements and improvements in its locomotive shops at Slaton, Tex., including a new engine house, machine shops and other buildings to cost close to \$200,000 with equipment.

The Lampasas Ice & Refrigerating Co., Lampasas, Tex., is considering the construction of a new cold storage and refrigerating plant, to cost about \$25,000 with equipment.

The Panhandle Sash & Door Co., Amarillo, Tex., has awarded a general contract to George Parr, 117 West Sixth Street, for a two-story addition, 125 x 150 ft., estimated to cost about \$65,000, of which more than \$25,000 will be expended for equipment. Robert B. Cranford, 1110 Grant Street, is architect.

The Common Council, Wichita Falls, Tex., is planning an early call for bids for a galvanized steel elevated water tank with tower, capacity 500,000 gal., estimated to cost \$40,000. Black & Veatch, Mutual Building, Kansas City, Mo., are consulting engineers.

L. A. Marshall, Floydada, Fla., is inquiring for equipment for a proposed grain elevator and wheat mill, including electric hoist, jacks for handling forms, electric motors, dryer, automatic scale, etc.

The Board of Education, Hernando, Miss., is considering the installation of manual training equipment in a new two-story high school to cost \$115,000, for which bids are being asked on a general contract. Pfell & Awsumb, Dermon Building, Memphis, Tenn., are architects.

The G. B. Kelly Lumber Co., Little Rock, Ark., is planning the construction of a new hardwood mill in the vicinity of Leesville, La., to cost in excess of \$50,000 with machinery.

The Jackson Machinery Co., Millsaps Building, Jackson, Miss., machinery dealer, has inquiries out for an electric-driven shovel, on crawlers or wheels, about 2½ yd. capacity; also for an excavating machine, Sauerman or similar type.

The Alabama Power Co., Birmingham, is planning the construction of a new automatic power substation at Decatur, Ala., about 10,000 hp. capacity, to cost in excess of \$100,000 with machinery.

The W. M. Smith Co., Birmingham, machinery dealer, has inquiries out for a portable alligator shear, to cut automobile frames.

Arthur G. McKee & Co., Cleveland, have been awarded a contract for a cracking plant for the Crystal Oil & Refining Co., Shreveport, La. It will require 125 tons of iron and steel.

## Cleveland

CLEVELAND, March 28.

MACHINE tool sales continue rather light. There is a scattered demand for single machines, but few orders for more than one tool. Inquiry is also slow. The volume of March sales will show very little change as compared with February. Operations of plants in some of the metal-working industries have gained somewhat this month. Automobile manufacturers and parts makers are buying very little equipment and not much business is looked for from this source during the spring months. The Firestone Tire & Rubber Co., Akron, Ohio, has an inquiry out for a large turret lathe.

The Aetna Standard Engineering Co., Youngstown, has taken an order for a disk rolling machine for producing steel disks and tubular shapes for an automobile manufacturer.

The Wood & Spencer Co., 1931 East Sixty-first Street, Cleveland, will enlarge its plant by the erection of a one-story addition, 89 x 150 ft. The extension is to allow for the rearrangement of plant equipment to effect economies in manufacturing operations. F. W. Wood is president.

Plans are being prepared by Wilbur Watson & Associates, architects.

The Lang Body Co., Cleveland, has awarded contract to the Sam W. Emerson Co. for a one-story factory.

The Iten Fibre Co., 2359 East Sixty-seventh Street, Cleveland, has purchased a site at East Ninety-third Street and Beckman Avenue, on which it will shortly begin the erection of the first unit of a new plant. George W. Pelton is the general contractor.

The John Harsch Bronze & Foundry Co., West 116th Street and Madison Avenue, Cleveland, will erect a two-story, 60 x 70 ft., addition to its plant to enlarge its architectural fabricating department. Some new equipment will be required, including polishing and sanding machines.

A new company, known as the Bailey Meter Co., on April 1 will acquire the flow meter business and patents of the General Electric Co. and the fluid meter and combustion control business and patents of the present Bailey Meter Co. E. G. Bailey, president of the Bailey company, will be president of the new organization. R. S. Coffin will continue as vice-president in charge of administration and finances. R. E. Woolley, now connected with the General Electric Co., will be vice-president in charge of engineering and sales. The new company will have its factory and general offices in Cleveland. The Bailey company's business in pulverized coal feeders, burners and water cooled furnace walls will be taken over by the Fuller-Lehigh Co., Fullerton, Pa., and the latter company will complete contracts and fill orders for equipment now on the books of the meter company.

The Board of Education, Shaker Heights, Ohio, is considering the installation of manual training equipment in an addition to be constructed to the junior high school to cost \$650,000, for which bids are being asked on a general contract until April 4. Howell & Thomas, 3868 Carnegie Avenue, Cleveland, are architects.

The Ohio Truck Body & Wagon Co., 3291 East Sixty-fifth Street, Cleveland, is revising plans for a new one-story unit to cost about \$50,000. A. G. Simon, Hippodrome Annex Building, is architect and engineer. Charles F. Koch is secretary.

The Cities Service Co., 60 Wall Street, New York, has authorized the construction of a new steel tower transmission line from the system of the Ohio Public Service Co., Sandusky, Ohio, to a connection with the Toledo Edison Co., Toledo, Ohio, both subsidiaries, a distance of about 50 miles, with automatic power substations, switching stations, etc. It will cost in excess of \$500,000.

## St. Louis

ST. LOUIS, March 28.

BIDS will soon be asked by the Board of Education, Chanute, Kan., for a two-story manual training school, to cost \$70,000 with equipment. T. W. Williamson & Co., Central Bank Building, Topeka, Kan., are architects.

The Ramsey Accessories Mfg. Corporation, 1107 North Fifteenth Street, St. Louis, manufacturer of automobile accessories, will soon begin superstructure for a new one-story and basement plant, 40 x 180 ft., for which a general contract recently was let to the Atlas Construction Co., International Life Building.

The Mid-Continent Petroleum Corporation, Landreth Building, St. Louis, T. M. Martin, in charge, has plans under way for a new storage and distributing plant at East St. Louis, Ill., with main two-story unit, 61 x 130 ft., and adjoining buildings, 30 x 120 ft. and 25 x 103 ft., to cost more than \$100,000 with equipment. D. X. Murphy & Brothers, Louisville Trust Building, Louisville, are architects.

The T. H. Electric Mfg. Co., Landreth Building, Fourth and Locust Streets, St. Louis, is planning the installation of machinery in a new factory for the manufacture of electrical equipment, including three lathes, two punch presses, two metal rotary saws, suitable for copper-cutting; two small shapers, metal planer, four-spindle adjustable drills, two motor-driven bench drills, two milling machines and other tools.

The Board of Education, Lincoln, Neb., plans the installation of manual training equipment in its proposed new junior high school to cost \$400,000, for which plans are being drawn by Davis & Wilson, 525 South Thirteenth Street, architects.

The Universal Automobile Service Co., Missouri Theater Building, St. Louis, has plans in preparation for a six-story service, repair and garage building, 140 x 150 ft., reported to cost in excess of \$400,000 with equipment. C. R. Felton is president.

The Wrought Iron Range Co., 5661 Natural Bridge Avenue, St. Louis, has awarded a general contract to the Murch Brothers Construction Co., Railway Exchange Building, for a two-story and basement addition, 35 x 46 ft.

The Springfield Wagon Co., Springfield, Mo., manufacturer of automobile bodies, wagons, etc., has acquired the plant and business of the A. B. C. Trailer Co., Memphis, Tenn., manufacturer of motor truck trailers, parts, etc. The new owner plans to remove the business to the Springfield works, which will be expanded. The company name will be changed to the Springfield A. B. C. Trailer Co. H. Frank Fellows is president.

## Indiana

INDIANAPOLIS, March 28.

CONTRACT has been let by the Link Belt Co., South Belmont Avenue, Indianapolis, to Latham & Walters, local, for a one-story addition, 80 x 180 ft., to cost about \$45,000. The extension will be used primarily for the manufacture of belt idlers, with the removal of the division at the Chicago plant now devoted to this line to Indianapolis.

The Chicago & Eastern Illinois Railway Co., 332 South Michigan Avenue, Chicago, will ask bids in about 30 days for its new locomotive and car shops at Evansville, Ind., to cost approximately \$200,000 with equipment.

The H. & P. Electric Co., Bloomington, Ind., has taken bids on a general contract for its new two-story plant, 50 x 105 ft., to cost close to \$50,000 with equipment. The Larkin Engineering Co., Granite Building, St. Louis, is architect and engineer.

The Marion Experimental Co., 629 South Alabama Street, Indianapolis, makers of special tools and dies, has moved to 601 East Washington Street.

The Wallace Machine & Tool Co., 470 Massachusetts Avenue, Indianapolis, manufacturer of dies and tools and also engaged in general machine work, recently incorporated for \$10,000, is now in operation. R. E. Pavey and F. B. Wallace are the proprietors.

## Pacific Coast

SAN FRANCISCO, March 23.

CONTRACT has been let by the California-Oregon Paper Mills, Los Angeles, to the Austin Co., for a new one-story and basement plant, to cost about \$65,000 with equipment.

The Wilmington Boat Works, Wilmington, Los Angeles, has plans under way for extensions and improvements, including the construction of a two-story building, 36 x 100 ft., to be equipped as a machine shop, mold, spar and rigging loft; a one-story forge and blacksmith shop, and an addition to the present drydock to increase the capacity to 600 tons. The machinery installation will include a 100-ton hydraulic boat lift with adjustable cradle. The entire project will cost in excess of \$100,000 with equipment.

The Simplex Mfg. Co., 2929 Elmwood Avenue, East, Oakland, Cal., manufacturer of metal shelving, shelf supports, etc., has secured a patent on a metal louvre ventilator for cooler closets, and will devote a considerable portion of production to this specialty.

A steam power plant, refrigerating plant, machine shop and other departments will be installed at the new plant to be constructed by the H. J. Heinz Co., Pittsburgh, at Berkeley, Cal., for which a general contract has been let to the Austin Co. It will cost about \$350,000 with equipment. The main unit will be 180 x 430 ft.

The Hollister Rubber Works, Hollister, Cal., have plans under way for a new one-story plant, 36 x 140 ft., to cost about \$35,000. Foundations will be arranged for an additional story. T. F. Charves and J. J. Held head the company.

The California Water Service Corporation, Bakersfield, Cal., plans the early purchase of a new deep well turbine pumping unit for installation at its No. 7 station; other pumping equipment will also be purchased. E. K. Barnum is chief engineer.

The Feenaughty Machinery Co., 309 East Yamhill Street, Portland, has received bids on a general contract for its new three-story plant, 100 x 100 ft., to cost close to \$60,000 with equipment. Ernest F. Kroner, I. O. O. F. Building, is architect.

The Interstate Foundry & Mfg. Co., Longview, Wash., has begun the construction of a new one-story plant, 80 x 140 ft. A one-story office building, 32 x 48 ft., will also be built. The entire project, with machinery, will cost approximately \$55,000.

The City Council, Healdsburg, Cal., will soon take bids for a 1200-gal. motor-driven centrifugal pumping unit, for the municipal waterworks. The city engineer is in charge.

The Mechanical Pattern & Foundry Co., 4545 Pacific Boulevard, Los Angeles, is enlarging its plant by the erection of a new foundry, 50 x 100 ft. Included in the equipment will be a No. 0 Whiting cupola.

The Warman Foundry, East Slauson Street, Huntington

Park, Cal., which recently erected a plant, will begin an expansion program. It has increased its capital stock from \$100,000 to \$200,000. G. B. Warman is president, and N. W. Warman, vice-president.

The Herberts Machinery & Supply Co., Los Angeles, has been appointed exclusive agent in California for the Chambersburg Engineering Co., Chambersburg, Pa.

The Pribnow Saw Sharpening Machinery Co., 424 East Third Street, Los Angeles, has been organized to manufacture improved filing room machinery for both band and circular saw mills under the patents of J. F. Pribnow, and is established in its own shop at the above address.

The Truscon Steel Co. has moved its San Francisco office from 709 Mission Street to 320 Sharon Building, New Montgomery Street.

C. D. Hobbs, general manager Western Hardware & Steel Co., Vancouver, B. C., who recently returned from England, states that his company will erect a plant on Granville Island, near Vancouver, for the manufacture of wire rope. While abroad, Mr. Hobbs purchased most of the machinery for the proposed new plant.

The Rix Co., Inc., San Francisco, has opened a warehouse at 2704 First Avenue, South, Seattle, and will carry a line of air compressors, compressor units, Thor tools and other compressor equipment. J. L. Cox, formerly in the sales department at the San Francisco offices, is in charge.

## Canada

TORONTO, March 28.

A STRONGER demand for machine tools features this market. Sales for the month of March show general improvement over those of either February or January and are also higher than those of a year ago. Inquiries for new tools also are improving. As a result of extensive industrial building operations, prospects are bright for a steadily increasing demand for equipment. Some large contracts are pending in connection with municipal waterworks, sewage and electric plants for which equipment will be required in the course of the next few months.

The City Council, Hull, Que., will call for tenders shortly for the supply of an 800-gal. water pump to cost \$15,500.

The Montague Electric Co., Montague, P. E. I., is having plans prepared for a power house to cost \$20,000.

O. Chalifour, Inc., Quebec, has been awarded contract for millwork in connection with \$15,500,000 pulp and paper mill to be erected at Limolou, Que., for the Anglo Canadian Pulp & Paper Co., care of the Gulf Pulp & Paper Co., 71 St. Peter Street, Quebec.

The Dominion Bridge Co., Lachine, Que., has been awarded contract for the structural steel for a \$500,000 drum barker and wood handling plant under construction at Port Alfred, Que., for the Port Alfred Pulp & Paper Co.

The city of Hamilton, Ont., proposes to spend \$576,000 on improvements and extensions to the waterworks plant and system this year, including an addition to the Beach pumping station, new steam turbine pump, boiler, etc. W. L. McFaul is engineer.

A by-law was passed by the Toronto City Council authorizing the commencement of work on waterworks exten-

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sion project to cost \$14,000,000. T. Foster is chairman of the Board of Control.

The Board of directors of the Canada Northern Power Corporation, Montreal, has authorized the installation of two new power units at the subsidiary plant of the Quinze Power Co., at Quinze Falls, Que., at a cost of \$1,250,000. A. J. Nesbitt of Nesbitt, Thomson & Co., Montreal, is president.

The Canadian Cellulose Co., Cornwall, Ont., is building a \$500,000 plant there for the manufacture of soda pulp.

The Wright-Hargreaves Co., Kirkland Lake, Ont., is making arrangements for the installation of considerable new machinery and milling equipment in its plant.

The Canada Steamship Lines, Ltd., has awarded contract to the Davie Shipbuilding & Repairing Co., Lauzon, Que., for the construction of two passenger steamers to cost approximately \$1,000,000 each.

The contract has been let to McLarty Brothers, Sault Ste. Marie, Ont., for a \$50,000 factory addition for the Dominion Tar & Chemical Co., Sault Ste. Marie.

The Thermo Tank Electric System, 4559 St. Denis Street, Montreal, will build a factory at a cost of \$30,000.

#### Western Canada

The British Columbia Veneer Works, Ltd., Vancouver, B. C., proposes to build a plant at Nelson, B. C., to cost \$75,000. A. Carrie, Nelson, B. C., is architect.

Plans are being prepared by the Robin Hood Milling Co., for the erection of mills at Saskatoon, Sask., to cost \$250,000.

#### Foreign

THE South Slovak Electric Plants Joint Stock Co., Komarno, Czechoslovakia, is being organized with a capital of 5,200,000 crowns (about \$150,000), to construct and operate a series of electric generating plants for service in the southern part of the country, including the Parkan, Stara Dala and Nove Zamky districts. The Government is interested in the enterprise and will assist in the financing. The American Consulate, Prague, Czechoslovakia, Charles S. Winans, consul, has information regarding the new organization.

The General Electric S. A. of Brazil, operated by the International General Electric Co., 120 Broadway, New York, has secured a substantial interest in the Companhia Brasileira de Energia Electrica, operating at Niteroy and vicinity, near Rio de Janeiro, and in the Companhia Linha Circular de Carros da Bahia and the Companhia Trilhos Centraes, operating electric light and power systems in the city and State of Bahia, Brazil. The purchasing company will be active in the management and plans extensions and betterments in the properties. The International company is also organizing another subsidiary, to be known as the General Electric S. A. of Colombia, to operate electric light and power utilities in Colombia and Venezuela. S. P. Savage, Jr., will be managing director, with offices at Colombia. Clark Minor is president of the parent organization.

The New Zealand Government Railways, Auckland, New Zealand, is asking bids until June 13 for hydraulic pumps, oil pumps, accumulators and other power equipment.

A Danish company has negotiations under way with the Government of Iceland for a concession at one of the waterfalls in the Vestfjord district, for power development in connection with a proposed plant for the production of salt-peter. A railroad will be built from the plant to a connecting point for shipping service. Information at the office of the Bureau of Foreign and Domestic Commerce, Washington, reference Denmark No. 48999. The American Consulate at Copenhagen, Denmark, H. Sorensen, commercial attache, also has information regarding the project, as well as data respecting other pending water power concessions in Iceland.

The Pan-American Petroleum & Transport Co., 120 Broadway, New York, has concluded arrangements for the purchase of a controlling interest in the American Maracaibo Co. and the Creole Syndicate, both operating oil properties in Venezuela, and is planning for increased operations and developments in production, storage facilities, pipe lines, etc. F. H. Wickett, chairman of the board and president of the purchasing company, will act in a similar capacity for the American Maracaibo Co.

#### Jewell Belting Co. Plans Liquidation

Directors of the Jewell Belting Co., Hartford, Conn., met last week to vote on the termination of the company's corporate existence. Changes in manufacturing conditions in the last ten years which have lessened the demand for belting materials and application of direct drives and motors cutting down the need for leather belting were given as the reasons for the action. The company operates a plant at Charter Oak, Conn., and a branch factory at Rome, Ga.

## THE LAST WORD

(Contributed by the Reader Service Department of the Iron Age Publishing Co.)



YOU and we and our 111,743,872 compatriots (corrected up to 12 midnight, March 29) are said to be consuming canned goods at the astounding rate of one can per person per day. (THE IRON AGE, March 24, page 843.)

It is a far cry to the uncanny days of a quarter of a century ago, when the can opener was sneeringly regarded as the mark of a slovenly housewife.

Hardly a day goes by without letters coming in from several budding Edisons. Most of the novitiate inventors are always in a feverish haste to know where they can buy this kind of a spring or that type of casting.

You can almost smell the midnight oil in the letters and sense the burning, almost fanatic, enthusiasm of the writers. Here is one, exactly as received:

"I have found a old IRON AGE of the 1906 and have written serval of adreses from. I have a patent appliable automobile skidd chain which are applied from the Seat in the car as ones are sitting in the car."

"Need at once an IRON AGE. Can we have one, as so much better rite now than I know of. About. I want things at once."

He has it. In return we wish he would send us a picture of the fearful and complicated mechanism which will apply non-skid chains by merely pressing a few assorted buttons and levers. This simple, little accessory will probably require a 10-ton truck to haul it.

While inspecting a large American electrical equipment plant, an English manufacturer noticed there was little provision for apprentice-training. "Where will you get your future supplies of skilled labor?" he inquired.

"From you," he was told, matter-of-factly.

America will continue to be a Mecca for skilled labor so long as the great difference in wages exists. The last issue of the *Monthly Labor Review* reports that the proportion of skilled labor immigration to total immigration is now twice what it was in pre-war years.

A pleasant situation for America.



The "Ask Me Another" epidemic is raging through the country. The questionnaire is being used or misused to establish intelligence quotients. Our inquiry editor has caught the germ and submits these half dozen questions which have been asked of him recently:

1. How did the word chaplet originate?
2. What is stretcher leveling?
3. What is the essential difference between a blue annealed sheet and a so-called black sheet?
4. Is soil pipe cast horizontally or vertically?
5. What is the chief characteristic of Swedish charcoal iron?
6. How is steel wool made?

Without consulting references, he answered correctly all but one. If you score 100 per cent, please write for your gold star.

A. H. D.